List of System Mechanisms in the NAS Architecture 6 database

Grouped by Domain

Domain: Air Traffic Control Automation

Mechanism: ATC Training System Simulator (ATCTSS) [6473]

The Air Traffic Control Training System Simulator (ATCTSS) includes predominantly commercial off-the-shelf (COTS) items to equip the FAA with up to 30 simulation air traffic control tower training systems and related equipment required for controller training. It provides the means to simulate unusual and emergency conditions in the control of air traffic from the tower cab without affecting safety to the flying public.

Application

Mechanism: Center Terminal Radar Approach Control Automation System Build 1 (CTAS Build 1) [176]

The Center Terminal Radar Approach Control (TRACON) Automation System Build 1 (CTAS Build 1) includes Traffic Management Unit (TMU) capabilities (timelines, load graphs, automated miles-in-trail, and the situation display) and single center metering using miles-in-trail or time-based scheduling and meter lists on en route displays.

Mechanism: Collaborative Air Traffic Management Technologies Work Package 1 (CATMT WP 1) [6331]

Collaborative Air Traffic Management Technologies Work Package 1 (CATMT WP 1) will be an integrated system used in the Traffic Flow Management System (TMS), developed for TFM modernization, by traffic management specialists (TMS) and coordinators to track and predict traffic flows; analyze effects of ground or weather delays; evaluate alternative routing strategies; improve collaborative decision making (CDM) among users; plan traffic flow patterns; and assess daily and long-term traffic flow performance in the National Airspace System (NAS) to better balance capacity and demand requirements for all users. Using the current Enhanced Traffic Management System (ETMS) functionality as a baseline and leveraging the hardware technology refresh provided under the "ETMS - HW Upgrade" mechanism, CATMT WP 1 will evolve to a new open systems software architecture. This new architecture is expected to lower the life cycle cost of software maintenance, the development and integration of existing and future functionality and capabilities, and interface to other domain automation systems.

A Service Level Agreement (SLA) with ATO-E will synchronize enhancements in CATMT WP 1 with: (1) En Route Automation Modernization (ERAM), (2) Electronic Flight Strip Transfer System (EFSTS) and (3) Airport Surface Detection Equipment (ASDE) modernization efforts.

Mechanism: Collaborative Routing and Coordination Tool (CRCT) [2278]

The Collaborative Routing and Coordination Tool (CRCT) consists of the hardware and software required to designate areas of severe weather or congestion as Flow Constrained Areas (FCA), identify flights predicted to enter the FCA, and assess the impact of rerouting flights identified on the en route traffic control center sector loading.

Mechanism: Common Automated Radar Terminal System Software (CARTS S/W) [2264]

Common Automated Radar Terminal System Software (CARTS S/W) modifications achieved commonality among the ARTS versions and platforms that will add capabilities including weather product integration on the displays, processing of All-purpose Structured EUROCONTROL Radar Information Exchange (ASTERIX) formatted surveillance data, improved traffic management and surveillance data processing, Ground-Initiated Communications Broadcast (GICB), and terminal data link functionality.

Mechanism: Common Automated Radar Terminal System Software (CARTS S/W) [2261]

Provides maintenance of the Common Automated Radar Terminal System Software (CARTS S/W) for ARTS IIE, ARTS IIIA, and ARTS IIIE. CARTS provides continuous real-time support to air traffic controllers at terminal sites including surveillance/tracking, controller data entry and display, aircraft separation assistance (safety functions), flight plan processing, data recording, external data publishing, and system monitoring and control functions. CARTS also provides support functions for data reduction, system evaluation, software development, and hardware and software maintenance. The functions include radar data processing (RDP), Minimum Safe Altitude Warning (MSAW); controller automated spacing tool, Converging Runway Display Aid (CRDA), and other tools to assist the terminal and tower controllers to manage the air traffic in the terminal area.

Mechanism: Common Automation Platform - Work Package 1 (CAP-WP1) [6320]

Common Automation Platform - Work Package 1 (CAP-WP1) is a component of CAP and operates in En Route and Terminal to provide surveillance data processing. The CAP with the Surveillance Data Processor (SDP) will make improvements to sensors and automation systems that will allow for expanded use of 3-mile separation and terminal procedures. The operational improvements enable more efficient control of aircraft and use of airspace. To accomplish this, all 1030/1090 MHz Beacon interrogators will be upgraded to disseminate their existing 1.2 milliradian azimuth accuracy and other information, such as time of measurement, confidence, quality, and so on. The automation system algorithms will be improved or new algorithms will be developed to exploit the additional information content of the improved surveillance reports. The method of presentation (display) to support 3-mile separation will be developed and tested to ensure safety. The existing long-range sensor surveillance update period is (12 seconds) and is insufficient to support 3-mile separation. In areas where only long-range sensors exist and where the Air Traffic Service requires 3-mile separation, these sensors may be modified to double the update rate to achieve 3-mile separation.

Mechanism: Conflict Probe (CP) [7140]

On 01 June 2006 the FAA announced the final deployment of the User Request Evaluation Tool (URET) conflict probe. With initial daily use (IDU) at Miami Air Route Traffic Control Center (KZMA), URET is now operational at all 20 FAA Air Route Traffic Control Centers (ARTCC) in the 48 contiguous states.

URET is a conflict probe that gives controllers a 20-minute “look ahead” at actual or potential aircraft to aircraft conflicts, a 40 minute “look ahead” for aircraft to airspace conflicts and helps them evaluate alternate resolutions. The benefits of improved system performance can be measured in real dollars saved. Controllers use this decision support tool to evaluate and grant requests for more time and fuel-efficient routes by aircraft. The controllers benefit from an increased situational awareness that helps improve the efficiency, capacity and overall performance of the National Airspace System (NAS).

Mechanism: Control by Time of Arrival (CTA) [734]

The Control by Time of Arrival (CTA) mechanism allows the use of arrival rather than departure-based rules, giving the National Airspace System (NAS) users more control over scheduling their own aircraft.

Mechanism: Critical Telecommunications (Critical Telecom) [1396]

Critical Telecommunications (Critical Telecom) is a telecommunications sustaining engineering program that satisfies the need for real-time telecommunications additions, moves, and changes that are largely unpredictable. Critical Telecommunications implements new telecommunications equipment at Air Route Traffic Control Center (ARTCC) installations and provides for equipment testing, training, and program management.

Mechanism: Departure Spacing Processor (DSP) [2274]

The Departure Spacing Processor (DSP) provides information (recommended departure time, etc.) to controllers to allow for sequenced departures from multiple airports in the New York, Boston and Washington D.C. metropolitan areas. The DSP utilizes graphical user interfaces (GUI) and near real-time electronic information exchange to evaluate aircraft flight plans, model projected aircraft demand, and provide departure window times to controllers at participating airports. The result is to eliminate or reduce contention for airspace at terminal-en route terminal boundary and departure fix points.

A DSP hardware technical refresh is required for the main servers by the end of calendar year (CY) 2007.

Mechanism: Dynamic Ocean Tracking System (DOTS) [650]

The Dynamic Ocean Tracking System (DOTS) automation system is located in each of the three Oceanic Air Route Traffic Control Centers (ARTCCs), (Anchorage, Oakland, and New York) and in the David J. Hurley Air Traffic Control System Command Center (ATCSCC). DOTS, upgraded and frequently referred to as "DOTS +", permits airlines to save fuel by flying random routes, in contrast to structured routes, and permits the air traffic controller to achieve lateral spacing requirements more efficiently. DOTS generates flexible oceanic tracks that are optimized for best airspace utilization and best time/fuel efficiency. Flexible tracks are updated twice a day using forecasted winds aloft and separation (vertical and lateral) requirements. The DOTS oceanic traffic display gives a visual presentation of tracks and weather. DOTS sends traffic advisories and track advisories to users and receives aircraft progress reports from the commercial communications service providers (CCSP). These external data exchanges are achieved through interfaces with the National Airspace Data Interchange Network (NADIN) Packet Switch Network (PSN) for Position Reports, Air Traffic Management (ATM) messages, Pilot Reports (PIREPS), and the Anchorage FDP2000. An interface to the Enhanced Traffic Management System (ETMS) will improve coordination between the oceanic and domestic Traffic Flow Management (TFM) systems/activities. The DOTS Weather Server, installed at the ATCSCC, receives National Weather Service (NWS) wind and temperature data via the Weather and Radar Processor / Weather Information Network Server (WARP/WINS) system. The weather data is then distributed to the ARTCCs via commercially provided Integrated Services Digital Network (ISDN) telephone lines. DOTS Plus supports separation reduction initiatives as stipulated in RNP-10 (Required Navigation Performance) for decreasing lateral separation from 100 nautical miles to 50 nautical miles.

Mechanism: Electronic Flight Strip Transfer System (EFSTS) [6671]

The Electronic Flight Strip Transfer System (EFSTS) is a system that provides for the transfer of flight progress strips from an Airport Traffic Control Tower (ATCT) facility to a Terminal Radar Approach Control (TRACON) facility. When implemented, the system will allow the users to go from paper to a total EFSTS at some or all of the ATCT facilities.

Mechanism: En Route Software (ER S/W) [2366]

En Route Software (ER S/W) resides on the Host Computer System (HCS). The software provides the functions required to safely and efficiently monitor and manage air traffic in the en route domain. Functionality includes: radar data processing, flight data processing, target acquisition and tracking, "handoff" execution, Flight Data Input/Output (FDIO), etc. Problem Trouble Reports (PTRs) and National Airspace System (NAS) Change Proposals (NCPs) to the current software are resolved through incremental software releases at approximately 18-month intervals. All such resolutions are reviewed and approved through the Fielded Automation Requirements Management (FARM) Team, which is the control board for En Route resources. This basic Jules Own Version of the International Algebraic Language (JOVIAL)/BAL software was first instantiated in the very early 1970s and has been continuously modified since that time.

Much of the tasking for this mechanism resides in the En Route Software Development Support (ERSDS) contract.

Mechanism: Enhanced Traffic Management System (ETMS) [2077]

The Enhanced Traffic Management System (ETMS) application is at the heart of the Traffic Flow Management (TFM) system, and through it flows the network of all TFM interfaces. The ETMS at the David J. Hurley Air Traffic Control System Command Center (ATCSCC) located in Herndon, Virginia, deals with the strategic flow of air traffic at the national level.

The FAA in general no longer refers to ETMS but TFM-I (CIP A05.01-02), which has had a technology refresh and under TFM-M (CIP A05.01-06) a new architecture of the infrastructure software platform will be modernized. The term ETMS is used on occasion for that portion of TFM. In fact, ETMS v8.2 release, which includes Airspace Flow Management functionality, is scheduled to be released in the spring of 2006.

The TFM-M at remote facilities is used for local airspace management within the local facility’s own area of responsibility. To facilitate coordination between the Traffic Management Coordinators (TMC) at remote Traffic Management Units (TMUs) and the Traffic Management Specialists (TMS) at the ATCSCC, each local ETMS can also view the national composite picture of traffic for which the ATCSCC has responsibility. The ETMS enables TMS and TMC personnel to track and predict traffic flows, analyze effects of ground delays or weather delays, evaluate alternative routing strategies, and plan traffic flow patterns.

The TFM-M central hub is located at the Volpe National Transportation System Center in Cambridge, Massachusetts. The hub collects flight schedules, and revisions, from National Airspace System (NAS) users, and collects actual traffic situation updates from local ETMS TMUs, and combines these with planned traffic initiatives (e.g., Ground Delay Programs (GDP)) to generate an Aggregate Demand List (ADL) that is output to users every five (5) minutes. The ADL contains predicted arrival and departure traffic at individual airports. NAS users, e.g., air carriers, can access the ADL data to plan and revise their flight schedules to work more efficiently with planned traffic initiatives. This interactive process of flight planning gives users more input to TMCs on how traffic initiatives will affect them and is the heart of the Collaborative Decision Making (CDM) process.

Traffic Management Units (TMUs) are located throughout the NAS and perform local flow control management functions. TMUs exist in all Air Route Traffic Control Centers (ARTCCs), 35 high activity Terminal Radar Approach Control (TRACON) facilities, 8 Airport Traffic Control Tower (ATCT) facilities, 3 Center Radar Approach (CERAP) facilities, and the FAA William J. Hughes Technical Center (WJHTC). TMU hardware suites are automated workstations that include computer entry/readout devices, network communications, a Flight Strip Printer (FSP), and a Traffic Situation Display (TSD).

NAS users are responsible for providing their own connectivity to the TFM-M hub. The various connective user networks are collectively referred to as the CDM Network (CDMnet), which provides two-way connectivity to TFM-M. Non-FAA users do not have access to all TFM-M data and processing tools.

Mechanism: Enhanced-Advanced Technologies and Oceanic Procedures (E-ATOP) [6312]

The Enhanced-Advanced Technologies and Oceanic Procedures (E-ATOP) project will provide and manage automation and information to control Oceanic air traffic. E-ATOP will facilitate seamless aircraft transitions and data transfers between domestic and oceanic airspace.

Mechanism: Final Monitor Aid (FMA) [68]

The Final Monitor Aid (FMA) provides controllers the ability to control multiple simultaneous approaches to parallel runways under instrument flight rule (IFR) conditions by providing increased definition for maintaining aircraft separation. The FMA system extracts data from the Automated Radar Terminal System (ARTS) or the Standard Terminal Automation Replacement System (STARS) and processes this data for display on the FMA displays.

Mechanism: Flight Object Management System - En Route (FOMS - En Route) [6317]

The FOMS is a component of the Common Automation Platform (CAP). The FOMS processes flight data received from multiple sources via the System Wide Information Management (SWIM) Management Unit. The FOMS also receives track data from the Surveillance Data Processor and associates tracks with flight data, producing the flight object, which is published to SWIM for subscriber use. Flight plan support functionality includes end-to-end profile evaluation in all phases of flight and evaluation against static and dynamic constraints (terrain, obstacles, airspace restrictions, etc.). The FOMS supports flight planning up to 180 days prior to day of flight. A user can access the flight object from initial to closeout in the same manner. The FOMS provides end-to-end flight data management from preflight to post analysis. Ownership of the flight object begins and ends with Traffic Flow Management and transitions during the flight to clearance delivery, ramp, surface, departure, transition to cruise, cruise, transition to arrival, and ramp. Flight data management is based on trajectory, assigned volumes, and "necessary" route structure.

Mechanism: Flight Object Management System - Terminal (FOMS - Terminal) [6316]

Flight Object Management System - Terminal (FOMS - Terminal) Description: The FOMS is a component of the Common Automation Platform (CAP). The FOMS processes flight data received from multiple sources via the System Wide Information Management (SWIM) Management Unit. The FOMS also receives track data from the Surveillance Data Processor (SDP) and associates tracks with flight data, producing the flight object, which is published to SWIM for subscriber use. Flight plan support functionality includes end-to-end profile evaluation in all phases of flight and evaluation against static and dynamic constraints (terrain, obstacles, airspace restrictions, etc.). The FOMS supports flight planning up to 180 days prior to day of flight. A user can access the flight object from initial to closeout in the same manner. The FOMS provides end-to-end flight data management from preflight to post analysis. Ownership of the flight object begins and ends with Traffic Flow Management (TFM) and transitions during the flight to clearance delivery, ramp, surface, departure, transition to cruise, cruise, transition to arrival, and ramp. Flight data management is based on trajectory, assigned volumes, and "necessary" route structure.

Mechanism: Flight Schedule Analyzer (FSA) [2367]

The Flight Schedule Analyzer (FSA) consists of post analysis (PA) and real-time (RT) components. PA FSA graphically shows data and analysis results on how well a Ground Delay Program (GDP) performed and what factors affected performance. The RT FSA generates a collection of reports that allow the specialists at Airlines and the FAA David J. Hurley Air Traffic Control System Command Center (ATCSCC) to monitor GDPs of specific flights as they are being executed. Real-time FSA may also be used to monitor "Pop Ups" (flights for which the Enhanced Traffic Management System (ETMS) has no scheduling data) to airports. Airlines use FSA data to internally address situations to assess the effectiveness of a GDP and to improve demand predictions. RT FSA is accessible from the ATCSCC intranet web page and generates reports including: (1) Performance, (2) Flight Status, (3) Compliance, (4) Cancelled flights that operated, (5) Pop-up flights, (6) Time-out delayed flights, and (7) GDP Program events.

Mechanism: Flight Schedule Monitor (FSM) [2277]

The Flight Schedule Monitor (FSM) is the main tool for the traffic management specialist at the FAA David J. Hurley Air Traffic Control System Command Center (ATCSCC) to monitor, model, and implement Ground Delay Program (GDP) operations. FAA and airlines use FSM to monitor demand through receipt of FSM demand pictures of airports updated every 5 minutes. FSM constructs "what if" scenarios for best options (i.e., best parameters) prior to making a GDP decision. Modeling may be used by: (1) the ARTCC Traffic Management Coordinator (TMC) to request ATCSCC implementation of a GDP in the event of significant congestion or if a demand/capacity imbalance is projected at an en route fix, route, or sector; (2) the ATCSCC to determine Air Route Traffic Control Center (ARTCC) start/end times, Airport Arrival Rate (AAR), and other parameters for a particular GDP scenario; and (3) the Airlines to see the effects of canceling or delaying a specific flights under a GDP. Flight Schedule Monitor Enhanced (FSM Enhanced) augments the existing FSM system by incorporating distance-based Ground Delay Programs (GDP), multiple-fix GDPs, airport GDPs, and playbook-based GDPs. Playbook refers to the National Playbook, which is a collection of Severe Weather Avoidance Plan (SWAP) routes that are pre-validated and coordinated with impacted ARTCCs. It is designed to mitigate the potential adverse impact to users and the FAA during periods of severe weather or other events that affect the National Airspace System (NAS).

Reports from the FSM modeling tool for each GDP include: (1) Carrier Statistics showing total minutes of delay for each flight, (2) Airborne Holding Flight Lists of arrival slots, (3) FSM Slot list, (4) Surface Delay histograms, (5) Control by Time of Arrival (CTA) Compliance Alarms for violations of arrival compliance, (6) Control by Time of Departure (CTD) Compliance Alarms for violation of Departure compliance, (7) Estimated Time En Route (ETE) on significant differences between actual vs ETMS estimated times, and (8) Spurious Flight Alarms triggered upon cancellation of false flights in a substitution stream.

Mechanism: Free Flight Phase 2 Integration (FFP2 Integration) [7288]

The Free Flight Phase 2 Integration (FFP2 Integration) project provides for integration efforts for National Airspace System (NAS) integration of FFP2. These efforts included; airspace redesign implementation activities with FFP2 tools, collecting/ publishing of metrics data for FFP2 implementation site, training, certification activities, requirements development, and procedures development. These procedures and subsequent training will require administrative adaptation and integration into the NAS.

Mechanism: Global Communications, Navigation, and Surveillance System – System Wide Information Management (GCNSS-SWIM) [7303]

In 2006 the System Wide Information Management (SWIM) portion was separated and became National Airspace System (NAS) Capital Investment Plan (CIP) Project Number M31.01-01.

This mechanism provides for the development, building and testing of the Global Communications, Navigation, and Surveillance System (GCNSS) related SWIM architecture and prototype system. Development activities include the following: Benefit-Cost Analysis, Trade Studies Analysis and development of the Functional Requirements Document, and the System Specification.

Mechanism: Ground Delay Program (GDP) [725]

Ground Delay Program (GDP), enhanced, provides the following functionality: (1) A capability for both the FAA and airlines to exchange airline schedule changes in both real-time and days in advance of being effective; (2) A new ground delay program algorithm, Ration by Schedule, to eliminate penalties that were a disincentive to airlines who submitted schedule changes earlier than existing procedures allowed; and (3) The same situational awareness of traffic problems to both the FAA and the airlines.

Mechanism: Next Generation Traffic Flow Management (NG-TFM) [6310]

The Next Generation Traffic Flow Management (NG-TFM) system provides an array of automation and data processing tools for Traffic Management Specialists (TMS) and Traffic Management Coordinators (TMC), as well as a gateway that enables National Airspace System (NAS) users to make changes in flight schedules based on planned traffic initiatives (e.g., Ground Delay Programs) and other NAS data. This enhanced decision support system provides increased information exchange between FAA service providers and NAS users. NG-TFM receives flight schedules from NAS users (e.g., air carriers) and combines these with weather data, NAS status data, and planned traffic initiatives to generate detailed graphical and textual traffic displays as far as 24 hours into the future on both the national and local scales. Features include both pre-flight and post-flight analysis tools, flight data archiving, enhanced traffic displays, traffic strategy (one or more initiatives) automation, "what if" strategy analysis, and automated TFM training tools.

NG-TFM is comprised of five different software component systems and will include a hardware and operating system software technological refresh. The complete NG-TFM software package includes changes to support interfaces with the proposed Flight Object Management System (FOMS) and proposed System Wide Information Management (SWIM) system. When complete, this will establish a new NG-TFM system baseline.

Mechanism: Post Operations Evaluation Tool (POET) [2401]

The Post Operations Evaluation Tool (POET) is an analysis system that allows users of the National Airspace System (NAS), the FAA David J. Hurley Air Traffic Control System Command Center (ATCSCC), Air Route Traffic Control Centers (ARTCC), and other FAA facilities to review the functional status of the National Airspace System (NAS) and help analyze collaborative routing problems in identifying areas of NAS congestion or inefficiency. A variety of performance metrics (e.g., departure, en route, and arrival delays as well as filed versus actually flown tracks) aid in the analysis.

Mechanism: Sector Design Analysis Tool (SDAT) [6340]

The Sector Design Analysis Tool (SDAT) is an analytic tool that evaluates changes in airspace design and traffic routing. SDAT is a component of the SDAT Enterprise, an FAA-owned decision support tool for analysis and design of airspace and traffic flows. Its primary focus is supporting the activities undertaken by FAA airspace offices at local, regional, and national levels. SDAT applications include airspace visualization, traffic flow analysis, and model integration. The SDAT Enterprise tool suite currently consists of three components: SDAT, the high-end visualization and analysis tool; SDAT Construct, for data and project management; and AT Vista, an air traffic control (ATC) display emulator.

Mechanism: Severe Weather Avoidance Program Enhancements (SWAP Enhancements) [736]

The Severe Weather Avoidance Program Enhancements (SWAP Enhancements) mechanism provides the initial severe weather rerouting planning capability. It also provides the weather specialists in the FAA David J. Hurley Air Traffic Control System Command Center (ATCSCC) with an automated tool that provides suggested reroutes around severe weather.

Mechanism: Standard Terminal Automation Replacement System Software (STARS S/W) [6350]

The Standard Terminal Automation Replacement System Software (STARS S/W) provides enhanced software capabilities to safely and efficiently monitor and manage air traffic in the terminal domain. Enhancements are provided in 4 general categories as follows: (1) Interface and integration of external systems including: Precision Runway Monitor (PRM), Surface Movement Advisor (SMA), passive Final Approach Spacing Tool (pFAST), Airport Movement Area Safety System (AMASS), Noise Abatement Monitoring (NAM), Automated Barometric Pressure Entry (ABPE), active Final Approach Spacing Tool (aFAST) and Tower systems, (2) Surveillance Data Processing (SDP) enhancements including: SDP Upgrades that enhance precision and accuracy, data transfer using the All-purpose Structured EUROCONTROL Radar Information Exchange (ASTERIX) protocol, Automatic Dependent Surveillance-Broadcast (ADS-B) integration, ADS-B applications (including Surface Conflict Probe), safety function enhancements to Conflict Alert (CA) and Minimum Safe Altitude Warning (MSAW), and Ground Initiated Communications Broadcast (GICB), (3) Flight Data Processing (FDP) enhancements including: STARS to STARS interfacility and STARS flight data processing (FDP) upgrades.

Mechanism: Surface Moving Map Database (SMMDB) [6390]

The Surface Moving Map Database (SMMDB) is a developmental situational awareness tool that will facilitate development of an Airport Map Database (AMDB) to enable Airport SMM and other shared surface situational awareness and management technologies needed by cockpit crews and airport vehicle operators. Information in the SMM Database is used by Navstar Global Positioning System (GPS) sensors to display aircraft/vehicle own-ship position on a highly accurate digital airport surface map. The digital maps depict airport features such as runways, taxiways, hold lines, ramps, hangars, and prominent airport structures. Following completion of the SMM, the data produced for the 82 airports with the greatest risk of runway incursions will be reprocessed and certified as AMDB for aircraft avionics and vehicle applications to enhance pilot and vehicle operator shared situational awareness. In addition to own-ship position, enhancements such as Automatic Dependent Surveillance-Broadcast (ADS-B) and/or Traffic Information Service-Broadcast (TIS-B) will provide the capability to display other aircraft/vehicles operating on the airport surface and aircraft on approach to landing.

Mechanism: Traffic Management Advisor - Multi-Center Prototype (TMA-MC Prototype) [2286]

The Traffic Management Advisor - Multi-Center Prototype (TMA-MC Prototype) mechanism was designed, integrated, and deployed by the National Aeronautics and Space Administration (NASA) to the Air Route Traffic Control Center (ARTCC) facilities in the Northeast U.S. plus the Terminal Radar Approach Control (TRACON) facility at Philadelphia, Pennsylvania. The TMA-MC retains the functions of a TMA Single Center (TMA-SC) standalone mechanism, but the MC mechanism provides the additional capability to share data between facilities for automation and collaboration. In addition to each Center's TMA processor receiving data directly from their respective Host Computer System (HCS), they also exchange data via a TMA network with each other.

Each TMA within the MC network has a defined role, and each function as the Controlling, the Arrival, or the Adjacent Center TMA (or any combination thereof). The Controlling Center TMA controls the Dynamic Planner scheduler, which generates Scheduled Times of Arrival (TOA). The Arrival Center controls the meter fix that feeds the aircraft into the TRACON and airport. The Adjacent Center feeds aircraft into the Controlling and Arrival Centers. In effect, TMA MC extends the aircraft prediction and controllability horizon into upstream Centers to prevent congestion or contention on arrival paths.

However, as of February 2006, the TMA-MC project had not been funded for inclusion in the National Airspace System (NAS).

Mechanism: Traffic Management Advisor Display (Free Flight Phase 1) (TMA Display (FFP1)) [2031]

The Traffic Management Advisor Display (Free Flight Phase 1) (TMA Display (FFP1)) is located at the Traffic Management Unit (TMU) and displays two views: The Timeline Graphical User Interface (TGUI) (TMA timeline data), and the Plan Graphical User Interface (PGUI) (Plan View Display). Separate from the TMA Display in the TMU, TMA meter list data is passed from the TMA workstation to the Host Computer System (HCS) for display on the Display System Replacement (DSR) console.

Mechanism: Traffic Management Advisor Single Center (Free Flight Phase 1) (TMA SC (FFP1)) [593]

Traffic Management Advisor Single Center (Free Flight Phase 1) (TMA SC (FFP1)) mechanism computes flight arrival sequencing, scheduled time of arrival (STA), and estimated time of arrival (ETA) at various points along the aircraft flight path to an airport. These points include an outer meter arc, the meter fix, the final approach fix, and runway threshold. In response to changing events and controller inputs, TMA-SC provides results to the en route sector team to maintain optimum flow rates to runways. It does this by providing continual updates of meter fix STA and delay information at a speed comparable to the live radar update rates. The team defines maneuvers and issues clearances so aircraft cross the meter fixes at the STA. Since TMA-SC calculates a schedule for arriving aircraft to meet Terminal Radar Approach Control (TRACON) facility acceptance rates set by Traffic Management Specialists (TMSs), selected airports must be the basis for a TMA-SC deployment plan. TMA also maintains statistics on the traffic flow and the efficiency of the airport and displays them to TMSs.

FFP1 deployed TMA SC to 7 sites and is followed by Free Flight Phase 2 (FFP2), which added four more sites. Software at the FFP1 locations will be upgraded during FFP2 for consistency and commonality with the systems being deployed to the FFP2 locations.

Mechanism: Traffic Management Advisor Single Center Free Flight Phase 2 (TMA SC (FFP2)) [701]

Traffic Management Advisor Single Center (Free Flight Phase 2) (TMA SC (FFP2)) is similar to TMA SC FFP1. It computes flight arrival sequencing, scheduled time of arrival (STA), and estimated time of arrival (ETA) at various points along the aircraft flight path to an airport. These points include an outer meter arc, the meter fix, the final approach fix, and runway threshold. In response to changing events and controller inputs, TMA-SC provides results to the en route sector team to maintain optimum flow rates to runways. It does this by providing continual updates of meter fix STA and delay information at a speed comparable to the live radar update rates. The team defines maneuvers and issues clearances so aircraft cross the meter fixes at the STA. Since TMA-SC calculates a schedule for arriving aircraft to meet Terminal Radar Approach Control (TRACON) facility acceptance rates set by Traffic Management Specialists (TMSs), selected airports must be the basis for a TMA-SC deployment plan. TMA also maintains statistics on the traffic flow and the efficiency of the airport and displays them to TMSs.

Initially TMA was installed at seven Air Route Traffic Control Center (ARTCC) facilities and seven TRACON facilities deployed under the TMA SC (FFP1) program. The TMA SC

FFP2 program installed TMA at four additional ARTCCs and four additional TRACON facilities making a total of 22 TMA SCs at 11 ARTCC and 11 TRACON facilities.

More recently TMA began initial daily use (IDU) on 21 April 2006 at the Seattle ARTCC (KZSE). It is the twelfth ARTCC to begin using the TMA system.

Mechanism: Traffic Situation Display (TSD) [796]

The Traffic Situation Display (TSD) is a computer system that receives radar track data from Air Route Traffic Control Centers (ARTCCs), organizes this data into a mosaic display, and presents it on a computer screen to monitor any number of traffic situations or system-wide traffic flows. The display allows the traffic management coordinator (TMC) multiple methods of selection and highlighting of individual aircraft or groups of aircraft. The user has the option of superimposing these aircraft positions over any number of background displays. These background options include ARTCC boundaries, any stratum of en route sector boundaries, fixes, airways, military and other special use airspace (SUA), airports, and geopolitical boundaries.

Mechanism: Unified Decision Management System (UDMS) [6309]

The Unified Decision Management System (UDMS) enhances the Collaborative Decision Making (CDM) process by enabling National Airspace System (NAS) users and the FAA to share flight schedules, planned traffic initiatives (e.g., Ground Delay Programs), advanced traffic flow predictions, and other NAS data electronically. UDMS upgrades the basic CDM functionality of the Traffic Flow Management-Modernization (TFM-M) system hub that connects to user-owned data networks. NAS users gain access to more sophisticated graphical and textual traffic flow predictions, as well as automated planning and analysis tools.

Mechanism: User Request Evaluation Tool Core Capability Limited Deployment (URET CCLD) [307]

The User Request Evaluation Tool Core Capability Limited Deployment (URET CCLD) provides conflict probe capabilities to the data controller display in Air Route Traffic Control Center (ARTCC) facilities. URET combines real-time flight plan and radar track data with site adaptation, aircraft performance characteristics, and winds and temperatures aloft to construct four dimensional flight profiles, or trajectories, for pre-departure and active flights. For active flights, it also adapts itself to the observed behavior of the aircraft, dynamically adjusting predicted speeds, climb rates, and descent rates based on the performance of each individual flight as it is tracked through en route airspace, all to maintain aircraft trajectories to get the best possible prediction of future aircraft positions. URET uses its predicted trajectories to continuously detect potential aircraft conflicts up to 20 minutes into the future and to provide strategic notification to the appropriate sector. URET enables controllers to "look ahead" for potential conflicts through "what if" trial planning of possible flight path amendments. URET enables controllers to accommodate user-preferred, off-airway routing to enable aircraft to fly more efficient routes, which reduce time and fuel consumption.

URET CCLD communicates with the controller at the Display System Replacement (DSR) D-position by means of a gateway to the DSR local area network (LAN). It obtains flight plan and track data from the Host Computer System (HCS) by direct connection, and it obtains wind, temperature and pressure data from Weather and Radar Processor Weather Information Network Server (WARP WINS) by means of a gateway. URET CCLD is deployed to six (6) sites and will be expanded to 20 under the URET National Deployment activity of Free Flight Phase 2 (FFP2).

Mechanism: User Request Evaluation Tool National Deployment (URET National Deployment) [687]

On 01 June 2006 the FAA announced the final deployment of the User Request Evaluation Tool (URET). With initial daily use (IDU) at Miami Air Route Traffic Control Center (ARTCC), ICAO Code KZMA, URET is now operational at all 20 FAA Air Route Traffic Control Centers (ARTCC) in the 48 contiguous states.

The User Request Evaluation Tool (URET) is a conflict probe decision support system. URET provides four key capabilities to Air Route Traffic Control Center (ARTCC) facilities: (1) Aircraft-to-aircraft conflict detection, (2) Aircraft-to-airspace conflict detection, (3) Evaluation of user or controller request for flight plan amendments or route changes; and (4) Enhanced flight data management. This tool allows controllers to determine whether requests for direct routes can be approved without conflicting with other flights or airspace restrictions.

URET began deploying nationally in FY 2003. No software builds are contemplated after FY 2006.

LAN

Mechanism: Host Interface Device/National Airspace System Local Area Network (HID/NAS LAN) [80]

The Host Interface Device/National Airspace System Local Area Network (HID/NAS LAN) is a two-way high-bandwidth LAN connection to the Host Computer System (HCS) to support co-located outboard processing and processes. The HCS presently supplies real-time surveillance, flight data and other information directly through HID. This data is distributed to the Store and Forward Application (SAFA), which is part of the National Offload Program (NOP) the purpose of which is to collect data from all En Route automation systems for strategic analysis. The HID distributes HCS data to two remote external locations: Customs and NATO.

HCS also exchanges data via HID through a database system, called the Host ATM Data Distribution System (HADDS). HADDS exchanges messages based on the Common Message Set (CMS), which is designed for use by HCS and user applications. HADDS reduces the workload on HCS by servicing the different application data requests while minimizing exchanges with HCS. Processors serviced by HADDS include the Traffic Management Advisory (TMA), the Enhanced Traffic Management System (ETMS) (being transitioning from ECG) and the Controller-Pilot Data Link Communications (CPDLC) (part of Data Link Processor (DLAP)). Note that CPDLC data is displayed at DSR but not through a direct link to DSR but rather through HCS. It is anticipated that the En Route Automation Modernization (ERAM) infrastructure will include a LAN replacement of the HID/NAS LAN. ERAM will also include a new Point of Presence processor, similar to HADDS, but it will be based on an extended CMS data set called CMA+.

Processor

Mechanism: Advanced Technologies and Oceanic Procedures (ATOP) [1737]

Advanced Technologies and Oceanic Procedures (ATOP) is a Non-Developmental Item (NDI) automation, communications, training, maintenance, installation, transition, and procedures development support acquisition. It will provide a Flight Data Processing (FDP) capability fully integrated with Surveillance Data Processing (SDP). The SDP will be capable of processing primary and secondary radar, Automatic Dependent Surveillance (ADS, both Addressable: ADS-A and Broadcast: ADS-B), Controller Pilot Data Link Communications (CPDLC) position reports, and relayed High Frequency (HF) radio voice pilot position reports from an HF radio operator employed by a communications service provider under contract to the FAA. ATOP will support radar and non-radar procedural separation, tracking clearances issued via CPDLC or messages through the HF radio service provider, conflict detection/prediction capabilities through the use of controller tools (Conflict Alert and Minimum Safe Altitude Warning for radar airspace and Conflict Probe for non-radar procedural separation applications), and fully automated coordination via Air traffic services Inter-facility Data Communications System (AIDCS) with AIDCS equipped adjacent Flight Information Regions (FIRs) . The ATOP inter-facility data communications system will be capable of supporting the International Civil Aviation Organization (ICAO) air traffic services message set. ATOP supports operations in which the information and primary capabilities required for the controller to maintain situational awareness and provide procedural separation services are available on the display (rather than paper flight strips).

ATOP replaces the following systems: Ocean Display and Planning System (ODAPS), Air Traffic Services Inter-facility Data Communications System (AIDCS), Interim situation Display (ISD), Telecommunications Processor (TP), and Ocean Data Link (ODL).

New York declared operational readiness (ORD) in June 2005 and Oakland declared ORD in October 2005. Anchorage is scheduled for the summer of 2006. If interested in reviewing data on AIDCS, please type mechanism ID#706 after the equal sign on the Address line above (mid=706).

Mechanism: Aeronautical Information Management (AIM) [6327]

The Aeronautical Information Management (AIM) system represents the evolution of the acquisition, storage, processing, and dissemination of aeronautical information in the National Airspace System (NAS). Aeronautical information is defined as any information concerning the establishment, condition, or change in any component (facility, service, or procedure, or hazard) of the NAS. Aeronautical information comes in two types with one being a somewhat static type, and the other being a more dynamic type. The static portion represents the aeronautical information baseline as of a particular date, while the dynamic portion updates particular aspects of the static portion due to system impacts or events. The static portion represents data that NAS automation systems and other users use to adapt their software to properly operate. The dynamic portion represents information typically contained in Notices to Airmen (NOTAMs) that indicate short-term changes to the static data.

Many NAS systems support the acquisition, generation, and dissemination of the static aeronautical information. Information of this type includes airspace structures, airways, locations of NAS facilities, inter-facility letters of agreement, and memorandums of understanding, obstructions, standard procedures, airspace charts, etc.

Several NAS systems also support the acquisition, generation, processing, and dissemination of the dynamic aeronautical information. Information of this type includes, facility outages, runway closures, temporary flight restrictions (TFR), airspace constraints, Significant Meteorological Advisory (SIGMETs), etc. This information must be disseminated to users and providers of air traffic services in a timely and efficient manner.

The AIM system will provide the central point for the dissemination of high quality, configuration controlled, information to NAS systems, service providers, and users of the NAS.

The AIM system will soon disseminate data based on the Aeronautical Information Exchange Model (AIXM) protocols.

Mechanism: Aeronautical Information System (AIS) [2379]

The Aeronautical Information System (AIS) is a web-based replacement system for the obsolete, maintenance intensive, non-Year 2000 (Y2K) compliant Leased A and B service (LABS) GS-200 system. AIS provides a workstation to: (a) process flight plans (file, amend, cancel, store, and transmit) including International Civil Aviation Organization (ICAO) flight plans, (b) retrieve aeronautical weather from the Weather Message Switching Center Replacement (WMSCR) system, collectives and AIS, and (c) process Notice to Airmen (NOTAM) (collect and distribute). The AIS uses the FAA Internet Protocol (IP) Routed Multi-user Net (FIRMNet) for access by 60+ flight data (FD) specialists in Air Route Traffic Control Centers (ARTCCs), 60+ in Automated Flight Service Stations (AFSSs), and 10+ in FAA Regional Offices (ROs). It uses Non-classified IP Router Network (NIPRNet) for access by 60+ Military Base Operations (MBOs), dedicated lines for access by 20+ Meteorological Weather Processing Centers and National Airspace Data Interchange Network (NADIN) Packet-Switched Network (PSN) for access to the WMSCR system. Alternate access is available via toll free service to a local service provider. The primary AIS server is located in the National Network Control Center (NNCC) Salt Lake City facility and the back-up server is located in Chantilly Virginia.

AIS underwent a technological refresh via replacement in 2004; hence the system is alternately referred to as AISR. Military base operations use AIS for flight plan input.

Mechanism: Air Traffic Operations Management System (ATOMS) [284]

The Air Traffic Operations Management System (ATOMS) consists of local area networks (LANs), data receivers, and/or personal computers at over 500 field sites. It provides field facilities with a "front end" method for data collection and means to transmit operational data to headquarters for inclusion in national databases and decision support systems. The data are essential to the accurate and complete analysis of air traffic systems' operation and the development and evaluation of system changes to improve system safety and efficiency. The data are collected at field facilities, then made available for management decisions affecting the air traffic control system. ATOMS will create an Operational Data Store (ODS) that can be accessed by both field and headquarters personnel. Currently field personnel do not have access to the data to adequately assess its performance.

Mechanism: Airport Movement Area Safety System (AMASS) [228]

The Airport Movement Area Safety System (AMASS) with Airport Surface Detection Equipment (ASDE) provides controllers with automatically generated visual and aural alerts of potential runway incursions and other potential unsafe conditions. AMASS includes the Terminal Automation Interface Unit (TAIU) that processes arrival data from the Airport Surface Detection Equipment (ASDE-3). AMASS adds an automation enhancement to the ASDE-3 and tracks the movement of aircraft and ground vehicles on the airport surface and presents the data to the tower controllers via the ASDE display. AMASS integrates and displays data from ASDE-3 and the Runway Status Lights (RWSL).

Mechanism: Airport Resource Management Tool (ARMT) [6937]

The Airport Resource Management Tool ARMT incorporates flight status data from the Atlanta Surface Movement Advisor (SMA), a prototype developed for use at the Hartsfield-Jackson Atlanta International Airport (KATL) by the National Aeronautics and Space Administration's (NASA) Ames Research Center in conjunction with the FAA and the major airline users at Atlanta. The ARMT gathers additional flight information from the Atlanta Automated Radar Terminal System (ARTS) and the manual scanning of bar coded paper flight strips at the Atlanta Airport Traffic Control Tower (ATCT). This manual bar code scanning is used to produce a near real-time recording of taxi clearance and takeoff clearance times. The ARMT also captures the traffic flow management (TFM) constraints, airport configuration and weather conditions currently in effect.

Mechanism: Algorithm Enhancement Work Package 1 (Algorithm Enhancement WP 1) [6615]

The Algorithm Enhancement program provides for new features for the Common Automation Platform (CAP).

Mechanism: Algorithm Enhancement Work Package 2 (Algorithm Enhancement WP 2) [6629]

The Algorithm Enhancement Work Package 2 (WP2) project provides for additional features for the Common Automation Platform (CAP).

Mechanism: Collaborative Air Traffic Management Technologies Work Package 2 (CATMT WP 2) [6573]

The Collaborative Air Traffic Management Technologies Work Package 2 (CATMT WP 2) segment will consist mainly of software releases that will provide the necessary functionalities to integrate the modernized Traffic Flow Management System (TFMS) with the Next Generation Air Traffic System (NGATS).

Mechanism: Collaborative Air Traffic Management Technologies Work Package 3 (CATMT WP 3) [6587]

The Collaborative Air Traffic Management Technologies Work Package 3 (CATMT WP 3) segment will consist mainly of software releases that will provide the necessary functionalities to integrate the modernized Traffic Flow Management System (TFMS) with the Next Generation Air Traffic System (NGATS).

Mechanism: Collaborative Air Traffic Management Technologies Work Package N (CATMT WP N) [6601]

The Collaborative Air Traffic Management Technologies Work Package N (CATMT WP N) segment will consist mainly of software releases that will provide the necessary functionalities to integrate the modernized Traffic Flow Management System (TFMS) with the Next Generation Air Traffic System (NGATS).

Mechanism: Common Automated Radar Terminal System - Model IIE (CARTS IIE) [286]

The Common Automated Radar Terminal System - Model IIE (CARTS IIE) provides radar data processing (RDP) and decision support tools to the controller in the terminal environment. Utilized at low to medium-size Terminal Radar Approach Control (TRACONs) facilities the ARTS IIE is capable of receiving input from up to two sensors, can process up to 256 tracks simultaneously, and support up to 22 displays. CARTS provides continuous real-time support to air traffic controllers at terminal sites including surveillance/tracking, controller data entry and display, aircraft separation assistance (safety functions), flight plan processing, data recording, external data publishing, and system monitoring and control functions.

CARTS performs the following functions: a. Track Processing (TP) – tracks aircraft and provides track and radar data to the LAN b. Common Processing (CP)- provides flight plan processing, safety functions [Minimum Safe Altitude Warning (MSAW), Conflict Alert (CA), Mode C intruder alert, Converging Runway Display Aid (CRDA), and Controller Automation Spacing Aid (CASA)], ARTCC interface processing, keyboard functional processing, Digital Altimeter Setting Indicator (DASI) interface processing, and ETMS interface processing c. Display Processing (DP)- provides controller display and keyboard functions and provides the interface to tower displays d. System Monitoring Console (SMC)- provides system management for CARTS hardware and software e. ARTS Gateway Processing (AGW)- shares data with external systems f. ARTS Radar Gateway (RGW)- provides most CARTS functions on an independent LAN for backing up the primary LAN functions g. Subsystem Interface Subsystem (SSI)- provides the LAN

The TP, CP, and SMC functions can be combined into one processing element or each subsystem can be a separate processing element.

Mechanism: Common Automated Radar Terminal System - Model IIIA (CARTS IIIA) [1]

The Common Automated Radar Terminal System - Model IIIA (CARTS IIIA) provides radar data processing (RDP) and decision support tools to the controller in the terminal environment. Planned for replacement by STARS at larger airports, ARTS IIIA remains in use with CARTS software. CARTS provides continuous real-time support to air traffic controllers at terminal sites including surveillance/tracking, controller data entry and display, aircraft separation assistance (safety functions), flight plan processing, data recording, external data publishing, and system monitoring and control functions.

CARTS performs the following functions: a. Track Processing (TP) – tracks aircraft and provides track and radar data to the LAN b. Common Processing (CP)- provides flight plan processing, safety functions [Minimum Safe Altitude Warning (MSAW), Conflict Alert (CA), Mode C intruder alert, Converging Runway Display Aid (CRDA), and Controller Automation Spacing Aid (CASA)], ARTCC interface processing, keyboard functional processing, Digital Altimeter Setting Indicator (DASI) interface processing, and ETMS interface processing c. Display Processing (DP)- provides controller display and keyboard functions and provides the interface to tower displays d. System Monitoring Console (SMC)- provides system management for CARTS hardware and software e. ARTS Gateway Processing (AGW)- shares data with external systems f. ARTS Radar Gateway (RGW)- provides most CARTS functions on an independent LAN for backing up the primary LAN functions g. Subsystem Interface Subsystem (SSI)- provides the LAN

The TP, CP, and SMC functions can be combined into one processing element or each subsystem can be a separate processing element.

Mechanism: Common Automated Radar Terminal System - Model IIIE (CARTS IIIE) [11]

The Common Automated Radar Terminal System - Model IIIE (CARTS IIIE) consists of the hardware platform and software required providing radar data processing (RDP) and decision support tools to the controller in the terminal environment. The ARTS IIIE is used at consolidated Terminal Radar Approach Control (TRACON) facilities. The Common ARTS program provided an ARTS IIIE capable of receiving input from up to 15 sensors, the ability to process up to 10,000 tracks simultaneously, and support up to 223 displays. CARTS provides continuous real-time support to air traffic controllers at terminal sites including surveillance/tracking, controller data entry and display, aircraft separation assistance (safety functions), flight plan processing, data recording, external data publishing, and system monitoring and control functions.

CARTS performs the following functions: a. Track Processing (TP) – tracks aircraft and provides track and radar data to the LAN b. Common Processing (CP)- provides flight plan processing, safety functions [Minimum Safe Altitude Warning (MSAW), Conflict Alert (CA), Mode C intruder alert, Converging Runway Display Aid (CRDA), and Controller Automation Spacing Aid (CASA)], ARTCC interface processing, keyboard functional processing, Digital Altimeter Setting Indicator (DASI) interface processing, and ETMS interface processing c. Display Processing (DP)- provides controller display and keyboard functions and provides the interface to tower displays d. System Monitoring Console (SMC)- provides system management for CARTS hardware and software e. ARTS Gateway Processing (AGW)- shares data with external systems f. ARTS Radar Gateway (RGW)- provides most CARTS functions on an independent LAN for backing up the primary LAN functions g. Subsystem Interface Subsystem (SSI)- provides the LAN

The TP, CP, and SMC functions can be combined into one processing element or each subsystem can be a separate processing element.

Mechanism: Common Automation Platform Work Package 2 (CAP WP2) [6298]

Common Automation Platform Work Package 2 (CAP WP2) continues adding functionality to capabilities provided in Work Package 1 to insure that recurring and technical refresh costs for air traffic control (ATC) automation elements are minimized by using as many common components as possible.

CAP WP2 incorporates upgrades to include the Flight Object Management System (FOMS) and technical refreshes of ATC applications, systems software and hardware to ensure use of common elements across the terminal, en route, oceanic, command center, and airport surface ATC automation domains.

Mechanism: Direct User Access Terminal Service (DUATS) [6]

Direct User Access Terminal Service (DUATS) is a vendor-provided service giving pilots convenient access to pre-flight aeronautical and weather information for flight planning purposes. It allows pilots to input instrument flight rules (IFR), International Civil Aviation Organization (ICAO), and visual flight rules (VFR) flight plans into the system.

Mechanism: En Route Automation Modernization (ERAM) [6334]

The En Route Automation Modernization System (ERAM System) will replace the existing diverse but functionally unequal primary and backup channels (Host Computer System (HCS) and the Direct Access Radar Channel (DARC)) with redundant, functionally equivalent primary and backup channels. The new primary and backup channels achieve identical full functionality by using highly reliable fault tolerant processing elements running identical software. A tertiary system with diverse software, and physical and electronic isolation from the ERAM primary and back-up systems, will be maintained as fall back until the functionality, reliability, and availability of ERAM is demonstrated in the field. A training subsystem with functionality identical to the operational system will permit training to be conducted in parallel with operations.

In the past decade, several functions (Conflict Probe (CP), Traffic Management Advisor (TMA), etc.) were implemented as outboard processors/processes to the HCS. This functionality will be supported by ERAM through a replacement Intermediate Point of Presence (IPOP), (i.e., Host Air Traffic Management (ATM) Data Distribution System (HADDS)), which will connect to the ERAM local area network (LAN) for exchange of Common Message Set (extended) data with the LAN connected processors (i.e., CP, TMA, etc.)

ERAM""s enhanced flight data processor (FDP) will accommodate flexible routing around congestion, weather, and restrictions and improve efficiency by providing improved traffic flows. The enhanced ERAM surveillance processing will accommodate a larger geographic coverage, increased quantity of radar inputs and, when available, integration of Automatic Dependent Surveillance Broadcast (ADS-B) data. In addition ERAM will use the improved accuracy and information disseminated by the sensors using the All-purpose Structured EUROCONTROL Radar Information Exchange (ASTERIX) format.

ERAM will allow for improved performance of decision support tools such as the Enhanced Traffic Management System (ETMS). ERAM will also incorporate TMA functions and multi-center metering using miles-in-trail or time-based scheduling and meter lists.

ERAM will employ an industry standard LAN-based system to improve the efficiency of integrating commercial-off-the-shelf solutions in the future. ERAM software will be developed using a common high-level language to increase the FAA""s access to market-based skills and lower the cost of development and lifecycle maintenance. ERAM""s design will enable future enhancements and maintenance of components without affecting operational availability and increased productivity from an integrated monitor and control capability.

The En Route Monitor and Control (EMAC) will consolidate the Monitor & Control (M&C) functions of legacy Air Route Traffic Control Center (ARTCC) systems into an open system architecture. It will reduce the size of the area needed for displaying system status of separate systems and provide a common Human-Computer Interface (HCI) functionality among them. The EMAC will include power system displays and will support prioritization of operational equipment maintenance and restoration efforts along the lines of the classification categories of critical, essential, and routine systems. EMAC will reduce the number of ARTCC M&Cs located in the ARTCC Monitor and Control Center (AMCC) and will be compatible with National Airspace System Infrastructure Management System (NIMS), which alternately refers to AMCC as the Systems Operation Center (SOC). EMAC will reduce M&C software development and training costs and, based on use of a common HCI, will ensure uniformity of functions performed by Airway Facilities specialists.

Mechanism: En Route Automation Modernization Release 1 (ERAM R 1) [6685]

The En Route Automation Modernization Release 1 (ERAM R 1) replaces the current Host Computer System (HCS) with new software and hardware to enable improvements in airspace capacity, efficiency, and safety that cannot be realized with the current system. Additionally, today's HCS hardware can only be maintained through 2012. Designed to handle traffic growth through the year 2020, ERAM enables controllers to better handle unplanned events, offers flexible routing options, and provides additional safety alerts to prevent collisions and congestion. Fully integrated with ERAM R 1 is a technical refresh of the radar controller position display processors to bring them into line with ERAM's modern, redundant architecture. The current processors were deployed in 1998 and are reaching their end of service life. Their processing power is less than a standard desktop computer and their resident graphics software language is both proprietary and outdated. To further mitigate risk, ERAM is leveraging existing FAA products and lessons learned. Specifically, the Display System Replacement (DSR) forms the basis of ERAM radar controller display functionality; the User Request Evaluation Tool (URET) forms the basis of the flight data processing and data controller display functionality; the Standard Terminal Automation Replacement System's (STARS) radar data tracker provides a standard tracker, and Microprocessor En Route Automated Radar Tracking System (MicroEARTS) forms the basis for ERAM separation assurance and safety functions. ERAM R 1 will complete the delivery of a new automation system at each En Route Air Route Traffic Control Center (ARTCC) in the continental United States.

Mechanism: En Route Automation Modernization Release 2 (ERAM R 2) [6699]

En Route Automation Modernization Release 2 (ERAM R 2) is the first maintenance and upgrade software release planned for 2012. This releases is required for ERAM maintenance and will include incremental functional enhancements not available in ERAM Release 1.

Mechanism: En Route Automation Modernization Release 3 (ERAM R 3) [6713]

En Route Automation Modernization Release 3 (ERAM R 3) is the second maintenance and upgrade software release planned for 2013. This releases is required for ERAM maintenance and will include incremental functional enhancements not available in ERAM Release 2.

Mechanism: En Route Automation Modernization Technology Refresh (ERAM Tech Refresh) [6559]

En Route Automation Modernization Technology Refresh (ERAM Tech Refresh) provides a technology refresh of ERAM in the FY 2012 through FY 2019 time frame.

Mechanism: En Route Monitor and Control (EMAC) [6952]

The En Route Monitor and Control (EMAC) project will consolidate the Monitor & Control (M&C) functions of legacy Air Route Traffic Control Center (ARTCC) systems into open system architecture. The EMAC system will reduce the size of the area needed for displaying system status of separate systems and provide a common Human Computer Interface (HCI) functionality among them. EMAC will include power system displays and will support prioritization of operational equipment maintenance and restoration efforts along the lines of the classification categories of critical, essential, and routine systems. EMAC will reduce the number of ARTCC M&Cs located in the ARTCC Monitor and Control Center (AMCC) and will be compatible with the National Airspace System (NAS) Infrastructure Management System (NIMS), which alternately refers to AMCC as the Systems Operation Center (SOC). EMAC will reduce M&C software development and training costs and, based on use of a common HCI, will ensure uniformity of functions performed by Airway Facilities specialists. As of March 2006 it appears that the functionality of EMAC will be incorporated into the En Route Automation Modernization (ERAM) program.

Mechanism: Enhanced Back-up Surveillance (EBUS) [6335]

The Enhanced Back-Up Surveillance (EBUS) system replaces the DARC system in use at the 20 Air Route Traffic Control Centers (ARTCC) in the contiguous United States (CONUS), the William J. Hughes Technical Center (WJHTC), and the FAA Academy (FAAAC). The EBUS design employs the existing FAA-certified software of the Microprocessor En Route Automated Radar Tracking System (Micro-EARTS) application to provide radar data processing (RDP) services for the replacement legacy backup system. Micro-EARTS provides key capabilities not supported by the Direct Access Radar Channel (DARC) legacy system it replaces, among which are the safety functions of Conflict Alert (CA), Mode-C Intruder (MCI), and Minimum Safe Altitude Warning (MSAW). EBUS also provides Next Generation Radar (NEXRAD) weather data to R-position users via the Display System Replacement (DSR) Backup Communications Network (BCN). EBUS makes the R-position functionality on the backup channel more comparable to that of the primary channel.

The EBUS application (Micro-EARTS) and the ECG backup gateway application will coexist together in the ECG backup gateway platform, renamed the Backup Interface Processor (BIP).

On March 31, 2006 the ARTCC facilities in New York, Miami and Los Angeles achieved full operational status for the EBUS system. This completes the deployment of EBUS to all 20 ARTCCs in the continental United States.

Mechanism: Environmental Remote Monitoring Subsystem (ERMS) [656]

The function of the Environmental Remote Monitoring Subsystem (ERMS) is to monitor and control environmental equipment in a variety of National Airspace System (NAS) facilities. Some of the facility parameters that are monitored include fuel tank leakage, facility door opening, and engine generator startup. ERMS performs within the Remote

Maintenance Monitoring System (RMMS) of the NAS as a fully functioning, remote monitoring subsystem (RMS). The RMMS interfaces with the Monitor and Control Facility (MCF) and the data are displayed via the Maintenance Automation System Software (MASS).

Mechanism: Evaluator (Evaluator) [6545]

In aircraft Trajectory-Based Operations (TBO) the "Evaluator:" (1) integrates/communicates weather, security, defense, environmental, safety, international considerations, and other information; (2) allows users to "post" or update desired 4-Dimensional (4-D) trajectories in a common system that continuously evaluates mutual compatibility; (3) predicts potential "over demand" situations, in multiple "capacity dimensions"—traffic density, environmental, security, etc.; (4) works across all time horizons from days/weeks/months prior to flight up to separation management (20 minutes or less), and (5) supports a distributed decision-making environment where players have clear, agreed-upon roles and interactions.

Mechanism: Evaluator Algorithm Enhancement WP 1 (Evaluator Alg Enhance WP 1) [6727]

In aircraft Trajectory-Based Operations (TBO) the "Evaluator:" (1) integrates/communicates weather, security, defense, environmental, safety, international considerations, and other information; (2) allows users to "post" or update desired 4-Dimensional (4-D) trajectories in a common system that continuously evaluates mutual compatibility; (3) predicts potential "over demand" situations, in multiple "capacity dimensions"—traffic density, environmental, security, etc.; (4) works across all time horizons from days/weeks/months prior to flight up to separation management (20 minutes or less), and (5) supports a distributed decision-making environment where players have clear, agreed-upon roles and interactions.

Mechanism: Evaluator Algorithm Enhancement WP 2 (Evaluator Alg Enhance WP 2) [6741]

In aircraft Trajectory-Based Operations (TBO) the "Evaluator:" (1) integrates/communicates weather, security, defense, environmental, safety, international considerations, and other information; (2) allows users to "post" or update desired 4-Dimensional (4-D) trajectories in a common system that continuously evaluates mutual compatibility; (3) predicts potential "over demand" situations, in multiple "capacity dimensions"—traffic density, environmental, security, etc.; (4) works across all time horizons from days/weeks/months prior to flight up to separation management (20 minutes or less), and (5) supports a distributed decision-making environment where players have clear, agreed-upon roles and interactions.

Mechanism: FAA Information Superhighway for Training (FIST) [2192]

The FAA Information Superhighway for Training (FIST) is an efficient, secure, platform-independent tool with continuous access to Airway Facilities users. Built by the FAA Academy's Airway Facilities Division (AMA-400), FIST is used as a consolidated centralized site for distributing training information and related resources. The primary purpose of this system is to service Airway Facilities in the following areas: Clip Media Reference, Automated Forms, Courseware Mass Storage, and Airway Facilities Training Bulletin Board. FIST will require a technical refresh from 2008-2011.

Mechanism: Flight Data Processing 2000 (FDP2000) [2000]

The Flight Data Processing 2000 (FDP2000) system replaced the oceanic flight data processing capability provided by Offshore Computer System (OCS) at the Anchorage Air Route Traffic Control Center (ARTCC). FDP2000 provides new hardware and software with added capabilities. The added capabilities include winds aloft modeling for improved aircraft position extrapolation accuracy, and support of Air Traffic Services Inter-facility Data Communications Systems (AIDC) ground-to-ground data link with compatible Flight Information Regions (FIRs). The OCS software was re-hosted from the Hewlett-Packard (HP) 1000 platform to the HP 9000 platform. FDP2000 provides flight data to the Microprocessor-En Route Automated Radar Tracking System (Micro-EARTS) radar data processing system. FDP2000 also integrates the existing Controller Pilot Data Link Communications (CPDLC) functions for data link communications with Future Air Navigation System 1/A (FANS 1/A)-equipped aircraft.

Mechanism: Flight Information System (FIS) [2464]

The Flight Information System (FIS) will provide the automated means for collecting and distributing weather (Service A messages), flight plan data, Pilot Report messages, and other operational information (Service B messages). The Flight Information System (rehosted) will provide a web-enabled means for collecting and distributing the above information to all air traffic facilities.

Mechanism: Host Computer System/Oceanic Computer System Replacement (HOCSR) [2293]

The Host Computer System and Oceanic Computer System Replacement (HOCSR) program was implemented because of potential year 2000 (Y2K) hardware issues with previous hardware. Accordingly, the HOCSR provided a new hardware platform, new peripherals (printers and Keyboard Video Display Terminals (KVDT), a new Direct Access Storage Device (DASD), and new OS-370 software extensions to control the new hardware using legacy National Airspace System (NAS) software applications. Hardware was replaced in both the En Route and Anchorage Oceanic automation environments. The HOCSR did not modify the legacy software functions of either the HCS system (e.g., flight data processing, radar data processing) or the Ocean Display and Planning System (ODAPS) automation systems (e.g., flight data processing). Likewise, HOCSR did not impact Host Interface Device National Airspace System (NAS) Local Area Network (HID/NAS LAN), User Request Evaluation Tool (URET), Display System Replacement (DSR) or the Peripheral Adapter Module Replacement Item (PAMRI).

Phase 1 and 2 (mainframe and software extension replacements) were completed prior to 2000. Phase 3 (DASD replacement) was completed in 2003. Phase 4 (peripheral replacement) was completed in 2004. Enhancements planned for 2005 and beyond were cancelled as the En Route Automation Modernization (ERAM) program overtook them. Each phase has its own waterfall, and consequently no waterfall can be provided in the location section below.

The Host Computer System (HCS) receives and processes surveillance reports, and flight plan information. The HCS sends search/beacon target, track and flight data, surveillance and alphanumeric weather information, time data, traffic management advisories and lists to the DSR. The HCS associates surveillance-derived tracking information with flight-planning information. The DSR sends requests for flight data, flight data updates, and track control messages to the HCS. HCS-generated display orders are translated for use within the DSR workstation. While radar data processing is distributed between the terminal and En Route computer resources, the HCS performs virtually all of the flight data processing for its entire geographical area of responsibility. Every tower (Airport Traffic Control Tower - ATCT) and Terminal Radar Approach Control (TRACON) facility relies exclusively on its parent HCS for flight data.

The HCS also runs algorithms that perform aircraft to aircraft (conflict alert (CA)) and aircraft to terrain (Minimum Safe Altitude Warning - MSAW) separation assurance. The HCS algorithms provide visual and audible alerting to the controller when conflicts are identified. The HCS receives aeronautical and adapted data from an external system, the NAS Adaptation Services Environment (NASE), via an internal component, the Adaptation Controlled Environment System (ACES), which feeds data to the HCS (data files) offline.

The HCS presently supplies real time surveillance, flight data, and other information to several decision support tools housed in collocated outboard processors connected via two-way high bandwidth links to the HCS and DSR. These are the URET and the Traffic Management Advisor (TMA). URET performs probing of tentative flight plan changes to determine their viability. TMA provides sequencing and spacing information to align the aircraft in En Route airspace for approach.

Mechanism: MicroEARTS Service Life Extension Program (MicroEARTS SLEP) [7082]

The Microprocessor En Route Automated Radar Track System Service Life Extension Program (MicroEARTS SLEP) project will continue to support implementation of MicroEARTS. Phase 1 will install an upgraded automation system at the Anchorage Air Route Traffic Control Center (ARTCC).

Mechanism: Microprocessor-En Route Automated Radar Tracking System (MEARTS) [219]

The Microprocessor-En Route Automated Radar Tracking System (MEARTS) is a radar processing system implemented with commercial off-the-shelf (COTS) equipment, for use in both En Route and Terminal environments. It provides single sensor and a mosaic display of traffic and weather using long- and short-range radars. At Anchorage, Alaska, Micro-EARTS also provides Automatic Dependent Surveillance-Broadcast (ADS-B) surveillance and display. Micro-EARTS interfaces with multiple types of displays, including Display System Replacement (DSR), Digital Bright Radar Indicator Tower Equipment (DBRITE), and the flat panel tower controller displays.

Mechanism: Military Airspace Management System (MAMS) [323]

The Military Airspace Management System (MAMS) is an automated system that schedules and documents Special Use Airspace (SUA) and other related airspace utilization within the U.S. Department of Defense (DoD). It receives airspace schedule messages (ASM) from local DoD airspace scheduling agencies. The MAMS Central Facility, located at Tinker Air Force Base, Oklahoma, transmits ASMs and utilization data to the FAA Special Use Airspace Management System (SAMS) Central Facility, located at the David J. Hurley Air Traffic Control System Command Center (ATCSCC). The MAMS receives airspace response messages from the SAMS.

Mechanism: Model One Full Capacity (M1FC) [2454]

The Model One Full Capacity (M1FC) system, located at Automated Flight Service Stations (AFSS), interface with a Flight Service Data Processing System (FSDPS) at FAA Air Route Traffic Control Centers (ARTCC). The M1FC is an information processing system used by Flight Service Specialists to collect and distribute Notices to Airmen (NOTAMS), weather information, and flight plan related data to General Aviation (GA) pilots. In addition, the system supports the timely initiation of search and rescue (SAR) processing and the capability to reconstruct system events based on time, terminal, or aircraft information.

Note that the Operational and Supportability Implementation System (OASIS) began replacing the M1FC, but OASIS implementation halted part way as decision was made to outsource flight services. In fact on February 1, 2005, the FAA awarded a contract for the services provided by the 58 Automated Flight Service Stations (AFSSs) in the Continental United States, Puerto Rico, and Hawaii to the Lockheed Martin Corporation. Lockheed Martin assumed responsibility for providing AFSS flight services on October 4, 2005. The program is called Flight Service 21 (FS21). With continued FAA oversight, Lockheed Martin will maintain deliverance of flight services according to the FAA""""s strict safety and service requirements. Additional information can be found at http://www.lmafsshr.com.

Mechanism: NAS Infrastructure Management System Phase 1 (NIMS Phase 1) [2371]
The National Airspace System (NAS) Infrastructure Management System (NIMS) Phase 1 will consist of the following: 1. Increase the effectiveness of the operation, management, and control of NAS services and facilities; 2. Ensure the appropriate NAS equipment assets will be available to provide the capacity needed to handle projected air traffic levels; 3. Analyze information to establish trends, design predictive adaptive maintenance actions, and reduce critical equipment outage situations and aircraft delays; 4. Create a common Airway Facilities (AF) operational data repository for accessibility across the user community; 5. Ensure that the required services are delivered in an era of declining monetary and personnel resources; and, 6. Reduce the future costs of doing business through AF workload reductions while continuously maintaining reliable, effective, and efficient service.

Mechanism: NAS Infrastructure Management System Phase 3 (NIMS Phase 3) [2373]
The National Airspace System (NAS) Infrastructure Management System (NIMS) Phase 3 will enhance Phase 2 enterprise and resource management, by further developing NAS customer and user interaction tools, and provide additional performance and cost trend analysis.

The NIMS Enterprise Management (EM) will monitor and control NAS subsystems, equipment and resources. The NIMS will provide status information to all NAS users in near real time via the System Wide Information Management (SWIM) system. An Enterprise Manager Suite, consisting of commercially available hardware and software components, is installed at each of the four Operations Control Centers.

The NIMS Resource Manager (RM) will support all NIMS Resource Functions. The NIMS RM, consisting of commercially available hardware and software components, is installed at each of the four Operations Control Centers.

The NIMS Enterprise Manager will be integrated with the NIMS Resource Manager to provide, Automated Incident Ticketing, a Common Logging System, Real Time System Performance Monitoring, and a Centralized Logistics/Maintenance System.

Mechanism: NGATS Automation Platform Initial Investment and Technology Refresh (NGATS Auto Platform Initial Invest Tech Refresh) [6643]
The Next Generation Air Transportation System (NGATS) Automation Platform (NAP) mechanism develops and deploys common hardware and air traffic control (ATC) applications software for ATC in the En Route, Terminal, and Oceanic domains. It will be a technological refresh of the Common Automation Platform Release 1 (CAP R1).

Mechanism: National Airspace System Infrastructure Management System Phase 2 (NIMS Phase 2) [2372]
The National Airspace System (NAS) Infrastructure Management System (NIMS) Phase 2 will enhance resource and enterprise management, by developing NAS customer and user interaction tools, and providing additional performance and cost trend analysis. The NIMS will provide status information to all NAS users in near real time via the System Wide Information Management (SWIM) system. NIMS Phase 2 will enhance NIMS Phase 1 by providing the tools to achieve the concept of NAS Infrastructure Management (NIM). This new approach to the operation and maintenance of the NAS infrastructure will incorporate a performance-based service management approach that is focused on achieving user and customer satisfaction and managing NAS infrastructure services. The key characteristics of the NIM concept are: (1) Consolidating expertise in control centers to provide rapid, effective response to customer needs, support centralized operational control, and gain efficiencies, (2) Centralized Remote Monitoring and Control of NAS infrastructure services and systems to provide efficient service delivery and systems management. (3) Nationwide Operations planning to provide standardized field operations across the NAS to facilitate consistent interaction with customers, (4) Information Infrastructure to provide real-time information collection and distribution to provide common NAS performance metrics and cost accounting, and (5) Performance Based Management to provide data for the prioritization of maintenance activities and investment decisions.

The NIMS Enterprise Management (EM) will monitor and control NAS subsystems, equipment, resources, and the NIMS. An Enterprise Manager Suite, consisting of commercially available hardware and software components, is installed at each of the four Operations Control Centers. The NIMS Resource Manager (RM) will support all NIMS Resource Functions. The NIMS RM, consisting of commercially available hardware and software components, is installed at each of the four Operations Control Centers.

The NIMS Enterprise Manager will be integrated with the NIMS Resource Manager to provide, Automated Incident Ticketing, a Common Logging System, Real Time System Performance Monitoring, and a Centralized Logistics/Maintenance System.

Mechanism: National Airspace System Resources System (NASR System) [69]
The National Airspace System (NAS) Resources (NASR) system is a relational data management system that collects, processes, and distributes aeronautical data in the form of electronic files, publications, and reports. NASR supports the day-to-day management of data about airports, runways, navigational aides, instrument landing systems, fixes, airways, military training routes, towers, and other fixed assets of the NAS. NASR is used to produce various aeronautical publications including the Airport/Facility Directory ("green book").

NASR, developed in 1999, is installed at the National Flight Data Center (NFDC -HQ 6th floor) and consists of a NASR processor and NFDC Workstations including the Temporary Flight Restriction (TFR) Builder. Backup (replication) systems are installed at the National Geodetic Survey (NGS) Office of NOAA and at the Technical Center. The NASR system at the Technical Center is used together with another system, the NAS Adaptation Service Environment (NASE) where the latter system performs filtering and adaptation of data to support software releases to major automation systems (e.g., STARS, ARTS, Host).

Web service access to NASR was introduced as eNASR in October 2005, hosted by a DMZ server.

Mechanism: Notices-to-Airmen Distribution System (NDS) [2466]
The Notice to Airmen (NOTAM) Distribution Program (NDP) provides a standardized, automated NOTAM distribution system that ensures that NOTAMs are delivered to FAA Air Traffic Control (ATC) facilities in a timely, accurate, and reliable manner. NOTAMs inform pilots of changes in conditions in the National Airspace System (NAS). The program originated from a June 2001 FAA memorandum which identified weaknesses in the then current NOTAM distribution method, emphasizing the urgent need for a replacement system to help ensure that critical safety information reaches the pilot and other system users. NDP deployments are dependent upon the availability of FAA Telecommunications Infrastructure (FTI) Internet protocol services at facilities that will receive the NOTAM Distribution System (NDS). The NDP will automate, standardize, and provide centralized NOTAMs dissemination to approximately 700 FAA facilities using reliable telecommunications provided by the FTI network. NOTAM data from the United States NOTAM System (USNS) central database in Herndon, Virginia will be transmitted to FAA's Airport Traffic Control Towers (ATCTs), Terminal Radar Approach Control (TRACON) facilities, Air Route Traffic Control Center (ARTCC) facilities, Federal Contract Tower (FCT) facilities, and Flight Service Station (FSS) facilities. In addition, the system provides for NOTAM receipt acknowledgement and an evolutionary path for the eventual distribution of all classes of NOTAMs (Domestic, Flight Data Center, International Civil Aviation Organization (ICAO), Military and Local). Recent accomplishments include: A Final Requirements Document for NDP production software client enhancements in January 2005. A finalized task order for NDP software client enhancements was completed in April 2005. In the summer of 2005 electric power and Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) compatibility testing were completed. Finally, the program was on schedule to complete user testing at the FAA William J. Hughes Technical Center (WJHTC) in January 2006.

Mechanism: Oceanic Flight Data Processing System (OFDPS) [635]
The Oceanic Flight Data Processing System (OFDPS) is a unique flight data processing system located in Honolulu, Hawaii. It uses modified Oceanic Display and Planning System (ODAPS) software to provide limited flight data processing including providing paper flight strips for the Micro-EARTS system at the Honolulu Center Radar Approach Control (CERAP). Like ODAPS, OFDPS was rehosted onto new hardware using the existing OFDPS application software as part of the En Route Host/Oceanic Computer System Replacement (HOCSR) program. The OFDPS functionality will be replaced with a Standard Terminal Automation Replacement System (STARS) Preplanned Product Improvement (P3I) functionality.

Mechanism: Operational and Supportability Implementation System (OASIS) [42]
Note that Operational and Supportability Implementation System (OASIS) program will be greatly affected because on February 1, 2005, the FAA awarded a contract for the services provided by the 58 Automated Flight Service Stations (AFSSs) in the Continental United States, Puerto Rico, and Hawaii to the Lockheed Martin Corporation. Lockheed Martin assumed responsibility for providing AFSS flight services on October 4, 2005. The program is called Flight Service 21 (FS21). With continued FAA oversight, Lockheed Martin will maintain deliverance of flight services according to the Agency""""s strict safety and service requirements. Additional information can be found at http://www.lmafsshr.com.

The capabilities provided by the OASIS include alphanumeric and graphic weather product acquisition and display, flight plan processing, search and rescue (SAR) services, and law enforcement support. The OASIS provides a real-time, multi-user, computer-based system that provides current weather information, forecast weather information, Notice to Airmen (NOTAM) information, and flight planning.

OASIS also supports flight service specialists at International Automated Flight Service Stations (IAFSS) that provide services associated with aircraft transiting the oceans.

Mechanism: Power Systems (Technical Refresh) (Pwr Sys (Tech Refresh)) [6353]
The Power Systems Technical Refresh (Pwr Sys Tech Refresh) mechanism provides for the conditioning of commercial power, including uninterruptible power systems (UPS), to

eliminate voltage dropouts, surges, and voltage sags caused by sources outside the facility. Power distribution, grounding, bonding, and shielding of electrical system within the facility is also part of the mechanism. The mechanism provides for the following tasks: (1) Air Route Traffic Control Center (ARTCC) Critical/Essential Power System (ACEPS), (2) Training Facility, (3) Critical Power Distribution System (CPDS), (4) Battery Replacements, 5.) Direct Current (DC) Systems, 6) Emergency Generators (EG), (7) Lightning Protection, Grounding, Bonding, and Shielding (LPGBS), (8) Power Cables, (9) Uninterruptible Power Systems (UPS), and (10) Contract Support.

Mechanism: Remote Maintenance Monitoring System (RMMS) [51]

The Remote Maintenance and Monitoring System (RMMS) consists of hardware and software components comprising a subsystem of the National Airspace System (NAS) Infrastructure Management System (NIMS). RMMS monitors system performance to detect alarm or alert conditions and transmits appropriate messages to the maintenance processor system/subsystem (MPS). RMMS initiates diagnostics tests and adjusts/changes system parameters or configurations when properly commanded. There are approximately 5,000 RMMS units in service.

Mechanism: Special Use Airspace Management System (SAMS) [324]

The Special Use Airspace Management System (SAMS) is an automated system that supports integrated Special Use Airspace (SUA) schedule operations within the FAA and between the FAA and the U.S. Department of Defense (DoD). The SAMS consists of the SAMS Central Facility (i.e., the SAMS processor), located at the FAA David J. Hurley Air Traffic Control System Command Center (ATCSCC), and SAMS Workstations located at the ATCSCC, Air Route Traffic Control Centers (ARTCCs), Towers, Terminal Radar Approach Control (TRACON) facilities, and Combined Center and Radar Approach Control (CERAP) facilities. The SAMS processor receives airspace schedule messages from the Military Airspace Management System (MAMS) Central Facility and transmits them to the SAMS Workstations. The SAMS processor transmits airspace response messages to the MAMS.

Mechanism: Standard Terminal Automation Replacement System (STARS) [91]

The Standard Terminal Automation Replacement System (STARS) processes primary and secondary radar information to acquire and track data points to display aircraft position for air traffic controllers. The STARS provides safety tools such as, conflict alert (CA), Mode C intruder (MCI), final monitoring aid (FMA), Minimum Safe Altitude Warning (MSAW), Converging Runway Display Aid (CRDA), and Controller Automated Spacing Aid (CASA). Also, the STARS provides the capability to implement the following enhancements: improved radar processing, Navstar Global Positioning System (GPS) compatibility, adaptive routing, Center Terminal Radar Approach Control (TRACON) Automation System (CTAS), data link implementation, improved weather display, and better utilization of traffic management information.

The rebaselining of STARS Phase 1 on 30 June 2005 ended future terminal replacement and modernization program using the STARS-only solution. As of the rebaseline date 47 sites were approved for replacement. Through Fiscal Year (FY) 2005: 47 systems had been ordered, 45 systems had been delivered, and 37 systems are in service.

Originally, STARS was to have been deployed at all 172 TRACON facilities, but now the plan is for STARS to be installed at 47 TRACON facilities by FY 2007.

The first STARS deployment occurred in 2002, and 39 of the 47 systems had been installed as of January 2006. The latest site to receive the STARS was Pittsburgh, PA in November 2005, and five more are scheduled for FY 2006. They are: Shreveport, LA; Jacksonville, FL; Tampa, FL; and two larger facilities at Indianapolis, IN, and Houston TX. This will leave Phoenix AZ, Dayton OH, and Norfolk, VA to round out the 47 sites in Fiscal 2007.

Terminal replacement and modernization for FY 2008 and beyond, originally scheduled for STARS, will be determined under the Terminal Automation Modernization Replacement (TAMR) program and may or may not use the STARS.

Mechanism: Standard Terminal Automation Replacement System Phase 1 Technology Refresh (STARS Phase 1 - Tech Refresh) [7155]

The Standard Terminal Automation Replacement System (STARS) is comprised of numerous commercial hardware and software components and organic FAA support is not available for these items. The STARS Technology Refreshment provides funds to address commercial-off-the-shelf (hardware and firmware)/commercially available software (COTS/CAS) component obsolescence during the life of the STARS. These COTS/CAS Management (Technology Refreshment) activities fall into two programs: annual qualification efforts and scheduled retrofits.

Mechanism: Standard Terminal Automation Replacement System Phase 1 Terminal Enhancements (STARS Phase 1 - Terminal Enhance) [7169]

Terminal Enhancements are the source of funding for software and support staff to sustain and enhance the Standard Terminal Automation Replacement System (STARS) operational systems/sites. The STARS program costs for Facilities and Equipment have been estimated for the timeframe fiscal year (FY) 2004 through FY 2031 for the support of 47 sites (43 IIIA Sites, and 4 IIE Sites). Life cycle software development in support of additional operational functionality will be provided on an annual basis.

Mechanism: Standard Terminal Automation Replacement System Technological Refresh (STARS Tech Refresh) [2260]

The Standard Terminal Automation Replacement System Technological Refresh (STARS Tech Refresh) mechanism updates the STARS to replace obsolete hardware and installs STARS at older Automated Radar Terminal System Model IIE and IIIE (ARTS IIE and ARTS IIIE) sites. Functional enhancements will include: Free Form Text, Trajectory Change Point (TCP) Defined Airspace, Local Information Service (LIS) and Integrated Terminal Weather System (ITWS) data displayed on controller displays.

Mechanism: Standard Terminal Automation Replacement System at Offshore Facilities (STARS Offshore) [2258]

The Standard Terminal Automation Replacement System at Offshore Facilities (STARS Offshore) will replace the Microprocessor-En Route Automated Radar Tracking System (MicroEARTS) radar processing system functionality and provide limited flight data processing. STARS provides the capability to implement the following enhancements: improved radar processing, Global Positioning System (GPS) compatibility, adaptive routing, Center Terminal Radar Approach Control (TRACON) Automation System (CTAS), data link implementation, improved weather display, and better utilization of traffic management information. This is a joint procurement with the U.S. Department of Defense (DoD) and will achieve a common baseline for the FAA and DoD systems. STARS Preplanned Product Improvements (P3I) will upgrade the capabilities of STARS.

Mechanism: Surface Management System Prototype (SMS Proto) [331]

The Surface Management System Prototype (SMS Proto) provides surface management data feeds via the Enhanced Traffic Management System (ETMS) interfaces to Airline Operational Centers (AOCs). The SMS Prototype main servers will be located at Airport Traffic Control Tower (ATCT) and Terminal Radar Approach Control (TRACON) facilities, with feeds to separate display processors located in the Traffic Management Unit (TMU) at various Air Route Traffic Control Center (ARTCC) and TRACON facilities, ground and ramp areas of ATCT facilities. SMS data will include surface surveillance data, flight plan data, gate assignment information, downstream restrictions and air carrier predictions of flight pushback times.

Mechanism: Surface Movement Advisor (Atlanta) (SMA (Atlanta)) [2392]

The Atlanta Surface Movement Advisor (SMA) processes and displays flight data for arrival and departure traffic, and provides the data to the Airline Operations Centers (AOCs).

Mechanism: Surface Movement Advisor (Free Flight Phase 1) (SMA (FFP1)) [78]

The Surface Movement Advisor (Free Flight Phase 1) (SMA FFP1) is located at Terminal Radar Approach Control (TRACON) facilities and Airport Traffic Control Tower (ATCT) facilities, has displays located at Airline Operations Centers (AOCs), and SMA and AOC’s share information using the Enhanced Traffic Management System (ETMS) and the ETMS Hub Site. The SMA obtains aircraft arrival information, including aircraft identification and position, from TRACON automation and provides SMA information to airline ramps at towers and AOCs. Continual updates of touchdown times generated by SMA help airlines manage ground resources at the terminal more efficiently.

The SMA system is based on a client-server architecture running in a UNIX environment. A fiber optic backbone between the airlines, the airport management, the (Airline) ramp towers and the FAA Control Tower links the SMA together. The system collects and manages various traffic data inputs from sources such as Automated Radar Terminal System (ARTS) (i.e., ARTS-IIIA and IIIE), Standard Terminal Automation Replacement System (STARS), TRACON Radar, Official Airline Guide (OAG), and Aircraft Communications and Reporting System (ACARS) in real time by the SMA server and auxiliary network computer clients.

AOCs provide the SMA with information such as flight readiness status within minutes of departure. The SMA generates messages when a flight: (a) transitions from an Air Route Traffic Control Center (ARTCC) to a TRACON, (b) is on final approach, and (c) has touchdown. SMA calculates estimated taxi time to the gate, time of arrival at the gate, and taxi time to take-off; and SMA uses historical data to project true demand on airport departure capacity.

In 2003, SMA began interfacing with STARS (in addition to ARTS) for receipt of flight arrival and departure information.

Mechanism: Surface Traffic Management System (STMS) [702]

The Surface Traffic Management System (STMS) provides flight and track data for surface management, combining the functions of SMA (Free Flight Phase 1 (FFP1)) and Surface Management System (SMS) prototype systems. Similar to the SMS, the STMS servers and display processors will be located at the same facilities and, in addition, display processors will be located at the FAA David J. Hurley Air Traffic Control System Command Center (ATCSCC) and Traffic Flow Management (TFM) hub site at the Volpe National Transportation Systems Center (VNTSC). STMS data will include gate assignment information, downstream restrictions and air carrier predictions of flight pushback times. The STMS may be enhanced to add communications via data link to the cockpit.

Mechanism: Terminal Automation Modernization Replacement Phase 2 Technical Refresh (TAMR Phase 2 Tech Refresh) [7012]

The Terminal Automation Modernization Replacement (TAMR) Phase 2 Technical Refresh segment will replace/upgrade the original TAMR equipment.

Mechanism: Traffic Flow Management System - Enhanced Traffic Management System Hardware Upgrade (TFMS - ETMS HW Up) [165]

The Traffic Flow Management System - Enhanced Traffic Management System Hardware Upgrade (TFMS - ETMS HW Up) mechanism is a technology refresh of existing equipment and workstations at the FAA David J. Hurley Air Traffic Control System Command Center (ATCSCC), the hub at the John A Volpe National Transportation Systems Center (Volpe Center), and Traffic Management Units (TMUs) located at Air Route Traffic Control Centers (ARTCCs), Terminal Radar Approach Control (TRACON) facilities and some Airport Traffic Control Towers (ATCTs).

As a program under the Traffic Flow Management-Modernization (TFM-M) program and Collaborative ATM (CATM) Segment, the TFMS-ETMS Hardware Upgrade will prepare the Traffic Flow Management Infrastructure for the software upgrade described under "TFMS-CATM-T Apps Upgrade".

The hardware refresh on the ETMS was completed at the Volpe Center Hub Site in June 2003 and at 77 remote FAA sites by December 2004.

A System Design Review (SDR) for the TFM-M was held in April 2005 and a Preliminary Design Review (PDR) TFM-M was held in September 2005. A build-out of TFM Enhanced Disaster Recovery Capability at the FAA William J. Hughes Technical Center (WJHTC) began in January 2006.

Mechanism: U.S. Notice to Airmen System (USNS) [2319]

U.S. Notice to Airmen System - (USNS) system, also known as USNSR (Replacement was achieved in 2002), collects, processes, and maintains a processed Notice to Airmen (NOTAM) database consisting of all NOTAMs on domestic and foreign civilian and military facilities, services, procedures, etc., pertinent to National Airspace System (NAS) users and specialists. An International Civil Aviation Organization (ICAO) NOTAM database exchanged with and is accessible by international agencies. In addition, Navstar Global Positioning System (GPS) NOTAMs are maintained. The USNS will distribute the processed NOTAM to the respective user via the Aeronautical Information System (AIS) and Weather Message Switching Center Replacement (WMSCR). The USNS replaced the current Consolidated NOTAM System (CNS) and consists of an enhanced processor and the NOTAM Workstation.

Workstation

Mechanism: Advanced Technologies and Oceanic Procedures Controller Work Station (ATOP Controller WS) [2185]

The Advanced Technologies and Oceanic Procedures Controller Work Station (ATOP Controller WS). The ATOP Controller Workstation is part of a non-developmental item (NDI) automation, training, maintenance, installation, transition, and procedures development support acquisition. The workstation will interface with the integrated Flight Data Processing (FDP). At Anchorage, where flight and surveillance data are integrated, the workstation will contain displays for information from primary and secondary radar, Automatic Dependent Surveillance (ADS), Controller Pilot Data Link Communications (CPDLC) position reports, and relayed pilot reports from High Frequency (HF) voice service provider. The ATOP workstation will support radar and non-radar procedural separation, tracking clearances issued via CPDLC or messages through the HF radio service provider, conflict detection/prediction capabilities through the use of controller tools, and coordination via Air Traffic Services Interfacility Data Communications System (AIDCS). Additionally, it is expected to support operations in which the information and primary capabilities required for the controller to maintain situational awareness and provide procedural separation services are available on the display (rather than paper flight strips).

Mechanism: Automated Radar Terminal System Color Display (ACD) [757]

The Automated Radar Terminal System (ARTS) Color Display (ACD) is a high performance, full function, color display that replaces the Full Digital ARTS Display (FDAD) and the Data Entry and Display Subsystem (DEDS). The ACD supports keyboard and trackball functions for the ARTS IIA, ARTS IIE, and ARTS IIIE. A primary and secondary radar data path to the ACD is provided by a radar gateway function incorporated in the event of a failure of either the ARTS IIE and ARTS IIIA processing systems.

Mechanism: Common Display Subsystem - Remote Phase 1 (CDSS-R Phase 1) [6307]

The Common Display Subsystem Remote (CDSS-R P1) provides the controller in the tower and the specialist in Flight Advisory Services an interface to the Flight Object Management System (FOMS) and Surveillance Data Processor (SDP). The workstation additionally provides the tower controller a display of arrival/departure surveillance data.

Mechanism: Common Display Subsystem - Remote Phase 2 (CDSS-R P2) [6300]

Provides Technical Refresh of Common Display Subsystem (CDSS) Remote Phase 1. CDSS-R P2 provides the controller in the tower and the specialist in Flight Advisory Services an interface to the Flight Object Management System (FOMS) and the Surveillance Data Processor (SDP). The workstation additionally provides the tower controller a display of arrival/departure surveillance data.

Mechanism: Common Display Subsystem Phase 1 (CDSS Phase 1) [6306]

The Common Display Subsystem (CDSS) attaches to the Common Automation Platform (CAP), which consists of processing for the Flight Object Management System (FOMS), the Surveillance Data Processor (SDP), and the CAP Workstation. The CDSS will be installed in En Route and Arrival/Departure facilities and will provide surveillance data processing and tracking on Surveillance Data Objects received from the CAP. The FOMS performs flight plan processing, associates flight and track data, and publishes the Flight Object on the System Wide Information Management network. The CDSS provides the controller interface for the FOMS and SDP.

Mechanism: Common Display Subsystem Phase 2 (CDSS Phase 2) [6299]

The Common Display Subsystem Phase 2 (CDSS Phase 2) mechanism provides funding for a technical refresh of the Common Automation Platform (CAP) Workstation developed in Phase 1. CDSS exchanges data with the CAP, which combines either Flight Object and/or Surveillance Data Processing. CDSS will be installed in En Route and Arrival/Departure facilities and will perform display of surveillance data processing and tracking of surveillance data received from CAP. CDSS is a workstation that provides the controller interface for the Flight Object Management System (FOMS) and surveillance data processing functions provided by CAP.

Mechanism: Data Entry and Display Subsystem (DEDS) [285]

The Data Entry and Display Subsystem (DEDS) is the Air Traffic Controller workstation for the Automated Terminal Radar System, Model IIIE (ARTS IIIE).

Mechanism: Digital Altimeter Setting Indicator (DASI) [65]

The Digital Altimeter Setting Indicator (DASI) provides a digital readout of barometric pressure and altimeter settings at Airport Traffic Control Tower (ATCT) and Terminal Radar Approach Control (TRACON) facilities.

Mechanism: Digital Bright Radar Indicator Tower Equipment (DBRITE) [2]

The Digital Bright Radar Indicator Tower Equipment (DBRITE) is a tower display system that provides a raster scan presentation of radar/beacon videos and automation system alphanumeric data. The system accepts radar, beacon, external map, analog data, and automation system data.

Mechanism: Digital Bright Radar Indicator Tower Equipment (DBRITE) [7227]

The Digital Bright Radar Indicator Tower Equipment (DBRITE) provides air traffic controllers at Airport Traffic Control Towers (ATCT) with a visual display of airport surveillance radar (ASR), beacon signals, plus displays aircraft position, identification (ID), and some weather information.

The deployment of the DBRITE system began in 1992 and was completed in 1998. There are over 675 DBRITE systems in operation at over 400 FAA airport towers. In addition, the Department of Defense (DOD) has deployed over 100 DBRITE systems within the continental United States and at selected overseas military bases.

Mechanism: Display System Replacement (DSR) [5]

The Display System Replacement (DSR) provides continuous real-time, automated support to air traffic controllers for the display of surveillance, flight data and other critical control information. This information is processed by the Host and Oceanic Computer System Replacement (HOCSR) and the Enhanced Direct Access Radar Channel (EDARC) subsystems. The DSR provides controller workstations, displays, and input/output devices and a communications infrastructure to connect the DSR with external processing elements of the en route air traffic control (ATC) automation system.

Mechanism: Display System Replacement - D-position Technical Refresh (DSR - D-posit Tech Refresh) [6370]

The Display System Replacement D-position Technical Refresh (DSR D-posit Tech Refresh) replaces the legacy D-position cathode ray tube (CRT) with a 20 1/4-inch diagonal square flat panel liquid crystal display (LCD). It also replaces the D-position DSR processor and DSR local area network (LAN) with a new processor and the User Request Evaluation Tool (URET) LAN. This will establish a new DSR infrastructure for the URET National Deployment. It will also simplify the future transition from the URET LAN infrastructure to the En Route Automation Modernization (ERAM) LAN infrastructure, by means of which the DSR processor and Conflict Probe (CP) processor will be attached for data exchanges. The legacy D-posit Tech Refresh on the primary channel will be augmented with a backup channel D-position by ERAM.

Mechanism: Display System Replacement - R-position Technical Refresh (DSR - R-posit Tech Refresh) [2470]

The Display System Replacement R-position Technical Refresh (DSR R-posit Tech Refresh) replaces the processor and local area network (LAN) infrastructure for the R-position in preparation for the En Route Automation Modernization (ERAM) system. The replacement display will provide full and equivalent functionality (flight and surveillance data) on both the primary and backup ERAM channels. The R-position display processor will have direct data exchange capability with each of the ERAM LAN attached processors, including the Surveillance Data Processor (SDP), Flight Data Processor (FDP), Conflict Probe Processor (CPP), Traffic Management Advisor (TMA), and Controller-Pilot Data Link Communications (CPDLC).

Mechanism: Display System Replacement Console Reconfiguration Monitor Replacement (DSR CRMR) [2469]

The Display System Replacement Console Reconfiguration Monitor Replacement (DSR CRMR) replaces the R-position cathode ray tube (CRT) with a 20 x 20-inch square flat panel liquid crystal display (LCD). Replacement of the large CRT with a LCD will free up space in the rear of the DSR console for relocating Voice Switching and Control System (VSCS) equipment. Relocating the VSCS Electronic Module (VEM) and the VSCS Training and Backup System (VTABS)--formerly known as VEM/PEM)--is part of this activity and will improve equipment efficiency, packaging, and the productivity of maintenance personnel.

Mechanism: En Route Information Display System (ERIDS) [6336]

The En Route Information Display System (ERIDS) provide real-time access to air traffic control information not currently available from the Host Computer System (HCS) and will make this auxiliary information readily available to controllers. ERIDS will be installed at various positions, including the Traffic Management Units (TMU), Center Weather Service Units (CWSU), and Air Route Traffic Control Centers (ARTCCs) Monitor and Control (M&C) Centers. ERIDS will be integrated into the display system consoles at each sector, will use the center's airspace configuration for sector assignments, and will allow changes in sector assignments. ERIDS will display graphic and text data products, including air traffic control documents, Notices to Airmen (NOTAMS), weather data, traffic management data, and general information. ERIDS will exchange information with other facilities via interfaces to the Weather and Radar Processor (WARP), the Weather Information Network Server (WINS), U.S. NOTAM System, the Enhanced Traffic Management System (ETMS), the National Airspace System Resources System (NASR), and the FAA Internet Protocol-Routed Multi-user Network (FIRMNet).

Three prototype ERIDS units were completed in Fiscal Year (FY) 2003 into the Boston (KZBW), Salt Lake City (KZLC), and Jacksonville (KZJX) ARTCC facilities. National deployment of 20 systems is scheduled begin in FY 2006 and be complete in FY 2008.

Mechanism: Enhanced Debrief Station (EDS) [2188]

The Enhanced Debrief Station (EDS) system is a personal computer (PC)-based medium fidelity simulation and training system, located at the FAA Academy, that works hand-in-hand with the Tower Operator Training System (TOTS), also located at the FAA Academy, by preparing the students in part-task functions of terminal air traffic control before they begin training in the TOTS environment. The EDS provides medium fidelity simulation for local or ground control tasks. It uses a three-screen presentation of the tower cab environment. A technical refresh will be required from 2006-2011.

Mechanism: Flight Data Input/Output (FDIO) [63]

The Flight Data Input/Output (FDIO) system provides flight progress information for use by the Tower, Terminal Radar Approach Control (TRACON) and Air Route Traffic Control Center (ARTCC) controllers. The FDIO system allows Air Traffic Control (ATC) specialists to input automated flight data, perform data manipulation, and print flight strips.

Mechanism: Flight Data Input/Output Commercial-Off-The-Shelf Replacement (FDIO COTS Rpl) [7361]

The Flight Data Input/Output Commercial-Off-The-Shelf Replacement (FDIO COTS Rpl) segment funds the replacement of obsolete equipment in FAA air traffic control (ATC) facilities with new commercial off-the-shelf (COTS) flight data input/output (FDIO) system components including displays, keyboards, personal computer (PC) remote control units and printers.

Mechanism: Flight Data Input/Output Modification (Technical Refresh) (FDIO Mod (Tech Refresh)) [1716]

The Flight Data Input/Output Modification (Technical Refresh) (FDIO Mod (Tech Refresh)) mechanism replaces components that are uneconomical to maintain in the system providing an interface between the air traffic controller (terminal or en route) and the center computer. FDIO provides flight plan data in printed form for Airport Traffic Control Tower (ATCT) and Terminal Radar Approach Control (TRACON) controllers.

Like FDIO, an Electronic Flight Strip Transfer System (EFSTS) is installed at large TRACONs and associated ATCTs to receive FDIO data and prints bar-coded flight strips for ATCT Controllers to scan when an aircraft departs, which relays departure information to the associated TRACON but not to the Host Computer System (HCS).

Mechanism: Full Digital Automated Radar Terminal System Display (FDAD) [79]

The Full Digital ARTS Display (FDAD) is the fully digital Automated Radar Terminal System (ARTS) display system that provides the display and data input devices for terminal controllers using ARTS IIIE and ARTS IIIA. The FDAD can work in analog video time-share mode or full digital mode. The present application is analog video time-share mode.

Mechanism: Integrated Information Workstation - Build 1 (IIW - Build 1) [6311]

Note: As of December 2005 the Joint Planning and Development Office (JPDO) is designing the Next Generation Air Transportation System (NGATS) so the IIW Build 1 and Build 2 will have new names.)

The Integrated Information Workstation - Build 1 (IIW Build 1) will include the infrastructure and system interfaces to acquire, analyze, store, update, display, and manage the following information in an integrated manner: (1) National Airspace System (NAS) aeronautical, (2) airport environmental, (3) airborne and surface surveillance, (4) flight information, (5) weather information, and (6) NAS status. Build 1 will also replace its predecessor system, FAA Data Display System, as well as interface with the following systems in support of its mission: Flight Object Management System (FOMS), System Wide Information Management (SWIM), Next Generation - Traffic Flow Management (NG-TFM), Maintenance Management System (MMS), Unified Decision Management System (UDMS), and Aeronautical Information Management (AIM).

Mechanism: Integrated Information Workstation - Build 2 (IIW - Build 2) [6301]

The Integrated Information Workstation Build 2 will incorporate new hardware technology and software enhancements through a technical refresh program. However, as of December 2005 the Joint Planning and Development Office (JPDO) is designing the Next Generation Air Transportation System (NGATS) so the IIW Build 1 and Build 2 will have new names.)

Mechanism: National Airspace System Information Display System - Tower (NAS IDS - Twr) [87]

The National Airspace System Information Display System - Tower (NAS IDS - Twr) is that portion of the NAS information display system that displays airport weather and environmental information to tower controllers and provides the information to the associated Terminal Radar Approach Control (TRACON) facility. It also supports the exchange of airport information with airport management, air carriers, and the National Weather Service (NWS). The NAS IDS Twr serves as a repository for airspace diagrams, approach plates, administrative services, and airport diagrams.

Mechanism: Operational and Supportability Implementation System Work Station (OASIS WS) [398]

The Operational and Supportability Implementation System - Work Station (OASIS WS) is a MS Windows ™-based personal computer (PC) located at each specialist position. It includes commercial off-the-shelf (COTS) software applications to provide the Automated Flight Service Station (AFSS) specialist with an integrated view of flight, alphanumeric, and graphic weather data. Pre-Flight and in-flight service functions are also available from these workstations.

Note, however, the OASIS program has been overtaken by events since on February 1, 2005, the FAA awarded a contract for the services provided by the 58 AFSSs in the Continental United States, Puerto Rico, and Hawaii to the Lockheed Martin Corporation. The new program is called Flight Service 21 (FS21). Lockheed Martin assumed responsibility for providing Automated Flight Service Station (AFSS) flight services on October 4, 2005. With continued FAA oversight, Lockheed Martin will maintain deliverance of flight services according to the FAAs strict safety and service requirements. Additional information can be found at http://www.lmafsshr.com. It has not been decided what will happen to the OASIS program.

Mechanism: Operations Information System (OIS) [2329]

The Operations Information System (OIS) is an intranet processor (like the Route Management Tool (RMT)) located at the FAA David J. Hurley Air Traffic Control System Command Center (ATCSCC) and outlying Traffic Management Units (TMUs) including Air Route Traffic Control Centers (ARTCCs) and Terminal Radar Approach Control (TRACON) facilities for displaying current delay information, airport closures, significant weather information and additional National Airspace System (NAS) information that could affect the efficient flow of air traffic nationwide.

Mechanism: Radar Automated Display System (RADS) [81]

The Radar Automated Display System (RADS) is the air traffic controller workstation for the Automated Radar Terminal System Model IIE (ARTS IIE).

Mechanism: Remote Automated Radar Terminal System Color Display (R-ACD) [6352]

The Remote - Automated Radar Terminal System (ARTS) Color Display (ACD) is a high performance, full function, and color display providing air traffic controllers with the functionality of the Digital Bright Radar Indicator Tower Equipment (DBRITE). This display supports keyboard and trackball functions for the ARTS II, ARTS IIE, and ARTS IIIE systems. A radar gateway function will be incorporated to provide a primary and secondary radar data path to the R-ACD in the event of failure of both the ARTS II and ARTS IIIA processing systems.

Mechanism: Standard Terminal Automation Replacement System Early Display Configuration (STARS EDC) [756]

The Standard Terminal Automation Replacement System, Early Display Configuration (STARS EDC) provided STARS workstations at a limited number of Automated Radar Terminal System Model IIIA (ARTS IIIA) facilities to replace aging Data Entry and Display Subsystems (DEDS) and provide validation of the STARS workstation design before the complete STARS is implemented. STARS EDC included updates to ARTS software for life cycle maintenance, additional human-machine interface (HMI) requirements for both tower and Terminal Radar Approach Control (TRACON) facilities, and ARTS IIIE human factors validation.

Mechanism: Standard Terminal Automation Replacement System Tower Display Workstation (STARS TDW) [6351]

The Standard Terminal Automation Replacement System Tower Display Workstation (STARS TDW) provides the interface between the Airport Traffic Control Tower (ATCT) controller and the STARS processing unit.

Mechanism: Surface Movement Advisor (Atlanta) Workstation (SMA (Atlanta) Workstation) [2393]

The Surface Movement Advisor (Atlanta) Workstation (SMA (Atlanta) Workstation) mechanism provides Arrival and Departure data displayed to users. Airline and FAA users are given varying levels of access to make inputs to the SMA (Atlanta) system via this workstation. Airline users in the Ramp Control Operations area are provided the ability to enter aircraft pushbacks to taxi status, gate arrivals and return to gate messages. Other airline users FAA users are provided options to enhance surface traffic movement by using automated data to optimize runway balancing.

Mechanism: Surface Traffic Management System Workstation (STMS WS) [2391]

The Surface Traffic Management System Workstation (STMS WS) provides for the display and operator entry of STMS data. The STMS WS will be located at both FAA and airline facilities. STMS WS user capabilities will vary based upon the user. FAA users may have the ability to change configuration information, while airline users do not. Full operational capability (FOC) for this mechanism extends beyond that of STMS because the WS is being installed at multiple Airline Operational Centers (AOCs).

Mechanism: Systems Atlanta Information Display System (SAIDS) [386]

A Systems Atlanta Information Display System (SAIDS) enables users to collect and/or input, organize, format, update, disseminate, and display both static and real-time data regarding weather and other rapidly changing critical information to air traffic controllers and Air Traffic Control (ATC) supervisors/Managers. SAIDS is installed at Airport Traffic Control Tower (ATCT) facilities, Terminal Radar Approach Control (TRACON) facilities, Air Route Traffic Control Center (ARTCC) facilities, FAA regional offices, and Flight Service Station (FSS) facilities.

Mechanism: Terminal Automation Modernization and Replacement Technological Refresh (TAMR Tech Refresh) [7349]

Note that this project has two names. Originally called Standard Terminal Automation Replacement System (STARS) Technology Refresh it is also referred to as Terminal Automation Modernization and Replacement (TAMR) Phase 1. As in any commercial-off-the-shelf (COTS)-based system, an aggressive hardware “technology refreshment” program is absolutely essential. Planning for technology refreshment enables identification and qualification of affected components before they become inoperable due to obsolescence. For example, the processor currently used in STARS is no longer available from the manufacturer. The consequences of obsolescence have collateral implications in the areas of engineering, training, maintenance and many other disciplines. Any plan for technology refreshment must include budget for adequately addressing solutions to all “life cycle” problems.

STAR software enhancements are required to meet the daily demands of the dynamic terminal air traffic control environment. In addition, systems such as STARS that use commercially based software are faced with the constant challenge of planning for the evolution of new operating systems. Keeping pace with the evolution of commercial software and planning for the qualification and maintenance of new operating systems requires recognition in the STARS budget. Any plan for “enhancements” must include budget for adequately addressing solutions to all “life cycle” problems.

On April 20, 2004, the FAA JRC directed a phased approach to terminal automation modernization. The JRC approved STARS as a replacement for 47 critical site systems within three years. Thus, the current scope of the STARS program encompasses deployment to the remaining designated sites, as well as sustainment and enhancement of those 47 sites. This budget supports the life cycle maintenance of 47 STARS sites.

Mechanism: Tower Operator Training System (TOTS) [2187]

The Tower Operator Training System (TOTS) refers to the replacement of the FAA Academy Tower Simulator. The TOTS is a simulator used to train airport traffic control tower specialists at the FAA Academy. This system is a critical training tool in the Academy’s initial qualification course for terminal air traffic controllers. The replacement TOTS includes the capability to replicate a level 4 tower with the graphics capability to generate complex traffic scenarios and meet new functionality requirements for interdependent systems including the Automated Surface Observing System (ASOS), interfacing Digital Bright Radar Indicator Tower Equipment (D-BRITE), Low-Level Windshear Alert System (LLWAS), and Runway Visual Range (RVR). TOTS will have a field of view of 210 degrees.

A technological refresh will be required from January 2006-2011.

Mechanism: Traffic Management Advisor Display Free Flight Phase 2 (TMA Display FFP2) [6363]

The Traffic Management Advisor Display (Free Flight Phase 2) (TMA Display (FFP2)) is located at the Traffic Management Unit (TMU) and displays two views: The Timeline Graphical User Interface (TGUI) shows TMA timeline data, and the Plan Graphical User Interface (PGUI) that is a plan view display. Separate from the TMA Display in the TMU, TMA meter list data is passed from the TMA workstation to the Host Computer System (HCS) for display on the Display System Replacement (DSR) console.

Domain: Air Traffic Control Communication

Mechanism: Aeronautical Telecommunication Network Air to Ground Router (ATN A/G Router) (ATN A/G Router) [6458]

The ATN Air-to-Ground (A/G) Router is used to provide A/G interconnection between an Aeronautical Telecommunication Network (ATN) Airborne Router and an ATN Ground Mobile Subnetwork.

The NEXCOM segment 1b is currently on hold while a joint communications study between Eurocontrol and the FAA are underway. Upon completion of this three-year study, the FAA hopes to have a stronger position on the future A/G communications system of which this ATN A/G Router is a part. This information will remain as a source of data and a placeholder pending the results of the study.

In fiscal year 2004, in recognition of the need for international harmonization on the best technical solution to the spectrum congestion problem, the FAA decided to defer developing and implementing the ground component of the NEXCOM system.

Data Communication

Mechanism: Aeronautical Data Link (ADL) - Enhanced (ADL-E) [6923]

Aeronautical Data Link (ADL) - Enhanced (ADL-E): Enables additional features of digital data link communications between air traffic controllers and pilots (and their airborne automation systems). ADL-E allows access to information previously unavailable in the cockpit and increases the reliability and efficiency of communications between pilots and airspace managers. ADL-E requires both software (commercial-off-the-shelf (COTS), nondevelopmental item (NDI) and developmental) and hardware (COTS, NDI) as part of the National Airspace System (NAS) ground infrastructure. ADL-E meets the initial requirements for the Next Generation Air Traffic System (NGATS) and is referred to in the Communications Roadmap as Enhanced Apllications.

Mechanism: Aeronautical Data Link Decision Support System Services (ADL DSSS) [7115]

Accounts for the transfer of funding for the Aeronautical Data Link Decision Support System Services (ADL DSSS) from FAA Research, Engineering and Development (R,E&D) to FAA Facilities and Equipment (F&E) funding. Identifies products to be included in DSSS. Develops models and simulations of DSSS. Develops requirements and standards, including protocols, data formats, and sample rates. Produces prototypes of avionics and ground systems that support DSSS. Develops specifications for the equipment.

Mechanism: Aeronautical Data Link National Deployment (ADL National Deployment) [6755]

Aeronautical Data Link (ADL) enables digital data communications between air traffic controllers and pilots (and their airborne automation systems). ADL allows access to information previously unavailable in the cockpit and increases the reliability and efficiency of communications between pilots and airspace managers. ADL requires both software (commercial-off-the-shelf (COTS), nondevelopmental item (NDI) and developmental) and hardware (COTS, NDI) as part of the National Airspace System (NAS) ground infrastructure.

As of April 2006 the ADL program is on hold and will be re-energized to work with the new En Route Automation Modernization (ERAM) system in the 2009-2010 timeframe.

Mechanism: Alaskan NAS Interfacility Communications System Phase II (ANICS Phase II) [7257]

The Alaskan NAS Interfacility Communications System (ANICS) replaces leased commercial communications circuits in Alaska with FAA-owned satellite earth stations and leased satellite transponders to provide reliable telecommunications services in locations where the FAA has experienced poor telecommunications performance. The increase of telecommunications availability provided by implementing ANICS corresponds to a direct increase in the availability of the National Airspace System (NAS) and improves air safety in Alaska. ANICS Phase II facilities are designed to provide communications available 99.99% of the time (Less than 8 hours of outage per facility, per year.) by using one set of equipment and one satellite. This level of service is used for aircraft pilot-to-flight service station communications, for transmission of weather information, and remote maintenance monitoring and control of air navigational aids. These services are considered essential for the successful control of airspace and aircraft. Twelve Phase II sites were built in Alaska. Seven have been commissioned as of September 2005 and the remaining five sites will be commissioned in the summer of 2006. In fiscal year 2008, five of these commissioned facilities will require F&E funding for start-up utility costs, per standard operating practices.

Mechanism: Commercial Weather Vendor (CWV) [2375]

With respect to future Flight Services, the FAA opted to "outsource" flight services by awarding Lockheed Martin (LM) a contract for Flight Services. On or about September 2007, Lockheed Martin will begin operating 20 or so Flight Services under a FAA contract within just the conterminous United States (CONUS). LM will provide both equipment and contractor personnel to perform the same level of services performed previously by the FAA (e.g., flight plan filing, pilot assistance as briefings re National Airspace System (NAS) status (i.e. Notices to Airmen (NOTAMs)), weather, and pre-flight briefings).

Presumably the Operational and Supportability Implementation System (OASIS) will be decommissioned and removed from approximately 14 or Flight Service Stations where it is currently installed.

Mechanism: Communications Management System (CMS) [6321]

The Communications Management System (CMS) Management and Control function performs tasks for overall management and control of all air-to-ground (A/G) and ground-to-ground (G/G) voice and data communications to support the System Wide Information Management (SWIM) system. CMS will also incorporate a reconfiguration control function to support reconfigurable airspace assignments, data routing, and a digital recording for both voice and data.

The CMS routing function is a data router that ensures transport of data communications among air traffic control (ATC) facilities and users of SWIM. Additionally, CMS integrates functionalities inherently provided by the voice switches, the voice recorders, and the Aeronautical Telecommunication Network (ATN) A/G router.

Mechanism: Controller-Pilot Data Link Communications Build I (CPDLC Bld I) [7198]

Notice: Miami Air Route Traffic Control Center (ARTCC) Controller-Pilot Data Link Communications (CPDLC) Build I was shut down as scheduled on October 1, 2004. All CPDLC equipment was removed and dispositioned by March 2005.

Deployed CPDLC Build I, which implemented the messages, required to perform Transfer of Communication (TOC), Initial Contact (IC), Altimeter Setting (AS), and information free text menu capability, which will be built by supervisory input and assigned to specific positions. These messages were sent to data link equipped aircraft using ARINC''s VHF Digital Link (VDL) Mode 2 air-to-ground (A/G) communications subnetwork. VDL Mode 2 is an evolutionary step satisfying performance and reliability requirements for situations in which the message is not time critical and sufficient time is available for retransmission by voice or data if there is not confirmed receipt of the message. CPDLC I provided air/ground data link functions using a standard International Civil Aviation Organization (ICAO) message set. It used VDL-2 as A/G subnetwork and included four message sets. Key site implementation was Miami, Florida in December 2001.

Mechanism: Controller-Pilot Data Link Communications Build IA (CPDLC Bld IA) [7212]

Notice: Miami Air Route Traffic Control Center (ARTCC) Controller-Pilot Data Link Communications (CPDLC) Build I was shut down as scheduled on October 1, 2004. All CPDLC equipment was removed and dispositioned by March 2005.

History: CPDLC Build IA was to leverage the FAA''s investment in the development of CPDLC Build I. CPDLC Build IA would have increased the message set to accommodate assignment of speeds, headings, and altitudes as well as a route clearance function. A capability to handle pilot initiated altitude requests would also have been implemented. CPDLC IA was to continue to use the VDL-2 A/G communications subnetwork. Airlines that participated in CPDLC Build I should have been able to participate in CPDLC Build IA without any avionics changes, as the avionics will have already been designed and certified for a larger message set. CPDLC Build IA was planned for a key site implementation in December 2002 with national deployment commencing six months later.

Mechanism: Controller-Pilot Data Link Communications National Deployment (CPDLC National Deployment) [1410]

Note that the FAA has put Controller-Pilot Data Link Communications (CPDLC) National Deployment on hold until the implementation of the En Route Automation Modernization (ERAM) program is well underway.

Controller-Pilot Data Link Communications (CPDLC) National Deployment entails implementation of the CPDLC Build 1 functionality to all Air Route Traffic Control Center (ARTCC) facilities. The CPDLC mechanism is a combination of communication and automation systems. It uses the en route controller display and automation systems to create International Civil Aviation Organization (ICAO) standard air traffic control (ATC) messages. It uses flight information from the automation system to address the messages and transmits/receives messages to/from CPDLC-equipped aircraft via a digital communication link. CPDLC replaces routine ATC voice communications between ATC specialists and pilots with more efficient data communications.

Mechanism: FAA Telecommunications Satellite (FAATSAT) [7271]

The FAA Telecommunications Satellite (FAATSAT) provides the FAA with a leased satellite interfacility communications network for the continental United States (CONUS), Puerto Rico, Hawaii, and the Virgin Islands. The network, provided by MCI, supports the FAA strategy for cost-effective interfacility communications transmission by providing an alternative path for primary telecommunications circuits that avoid single points of failure through circuit diversity. The network meets National Airspace System (NAS) service availability and message quality requirements. The FAATSAT is also necessary for such projects as the Weather and Radar Processor (WARP) and the Integrated Terminal Weather System (ITWS) programs that require large bandwidth, high-capacity transmission capabilities.

FAATSAT is scheduled to be replaced by June 2006.

Mechanism: Flight Information Service - Data Link (FISDL) [746]

The Flight Information Service - Data Link (FISDL) provides pilots weather, Notices to Airmen (NOTAMs), airfield information and other selected data through a commercial communications service provider (CCSP) operating on very high frequency (VHF) frequencies that the FAA obtained from the Federal Communications Commission (FCC). The FISDL service is being facilitated through a Government-Industry Project Performance Agreement (G-IPPA) allowing a commercial weather service provider (CWSP) to offer graphical and textual FIS/weather products to the cockpit of properly equipped aircraft. This commercially-operated service is being provided as a near-term capability consistent with the FAA FIS Policy Statement of 1998. This CCSP process will be phased out when the FAA is able to offer similar FISDL services through FAA operated data link resources (e.g., via the universal access transceiver (UAT) link using the Broadcast Services Ground Station (BSGS) and Traffic Information Service (TIS)-FIS Broadcast Server mechanism).

Mechanism: High Frequency Data Link (HF Data Link) [698]

The High Frequency Data Link (HF Data Link) provides two-way, low-speed, analog data communications over HF radios. A Commercial Communications Service Provider (CCSP) in the transoceanic domain provides HF Data Link.

Mechanism: Multi-Sector Oceanic Data Link (MSODL) [705]

The Multi-sector Oceanic Data Link (MSODL) system supports air-to-ground data link communications and extends single sector data link functionality to all Oceanic Display and Planning System (ODAPS) sector positions. Oceanic Data Link (ODL) gives controllers two-way electronic communications with aircraft equipped with data link. The technology is designed to reduce or eliminate the need for voice communication thus improving the reliability and timeliness of message delivery. The ODL provides a means to automatically check pending clearances for conflicts, while enabling flight crews automatically to load flight clearances into the Flight Management System (FMS). The ODL also gives controllers an integrated interface with the flight data processor (FDP). It also addresses problems with the existing high frequency (HF) communications with aircraft, such as frequency congestion, transcription errors, and lack of timeliness.

Mechanism: NGATS Data Communications (NGATS Data Comm) [7379]

To meet the NGATS timetable, the acquisition of air/ground data communications components must begin no later than fiscal year (FY) 2008. This project provides for the development of system level requirements, research to support procedures development and rule making changes, as well as the acquisition of the chosen means for data communications transmission between the aircraft and the ground and the automation functions for air traffic control message generation and exchange. This program will introduce a new capability into the National Airspace System (NAS). Alternatives analyses that will be conducted during FY 2006 and 2007 will determine the most cost-effective solution for introducing these capabilities, and the best ways to leverage existing infrastructure and automation.

Mechanism: NOTAM Distribution Program (NDP) [6966]

The Notice to Airmen (NOTAM) Distribution Program (NDP) provides a standardized, automated NOTAM distribution system that ensures that NOTAMs are delivered to FAA Air Traffic Control (ATC) facilities in a timely, accurate, and reliable manner. NOTAMs inform pilots of changes in conditions in the National Airspace System (NAS). The program originated from a June 2001 FAA memorandum which identified weaknesses in the then current NOTAM distribution method, emphasizing the urgent need for a replacement system to help ensure that critical safety information reaches the pilot and other system users. NDP deployments are dependent upon the availability of FAA Telecommunications Infrastructure (FTI) Internet protocol services at facilities that will receive the NOTAM Distribution System (NDS).

The NDP will automate, standardize, and provide centralized NOTAMs dissemination to approximately 700 FAA facilities by the end of FY 2010, using reliable telecommunications provided by the FTI network.

Mechanism: Satellite Telecommunications Data Link (SATCOM DL) [786]

Oceanic Centers use Satellite Telecommunications Data Link (SATCOM DL) mechanism transfer data between ground stations and aircraft. The FAA contracts for the satellite communications services and uses the Future Air Navigation System 1/A (FANS-1/A) applications in the Oceanic automation system.

The FAA has no plans to develop its own SATCOM air-to-ground communications system.

Mechanism: System Wide Information Management (SWIM) [7317]

The System Wide Information Management (SWIM) program provides the technology for precise information sharing among users including a common air surveillance picture, improved data exchange, and situational awareness. This system is a command and response database that draws information from other systems and makes it available to authorized users. This system provides the potential for reduced separation standards for Air Traffic Management (ATM) and flight conformance monitoring for homeland security.

The SWIM program will improve utilization of airspace by providing users with information on heavily loaded air traffic control (ATC) sectors and other factors that would impact flight delays. It is part of the future planning to upgrade automation systems and provide more accurate and timely information for all system users. This program will demonstrate the effectiveness of seamless information sharing between Flight Operations Centers and air traffic controllers using SWIM. The SWIM program will also provide important business case information, technical analysis and documentation to support the decision process for future National Airspace System (NAS) capacity improvements.

Mechanism: System Wide Information Management Spiral 1 (SWIM Spiral 1) [6318]

SWIM provides for National Airspace System (NAS)-wide transport and sharing of information between the Federal Aviation Administration (FAA) systems and between FAA and external users. SWIM is a uniform single point of entry for users to publish and subscribe to NAS data through secure access mechanisms. SWIM provides metadata for users to discover data via SWIM. A central SWIM Directory Management Unit will maintain a directory of data available for subscription and publication.

Spiral 1 consists of prototyping (at WJHTC) and requirements definition in preparation for implementation to be accomplished in subsequent spirals.

The SWIM program is undergoing a major realignment as of the spring 2006. Details will be forthcoming.

Mechanism: System Wide Information Management Spiral 2 (SWIM Spiral 2) [6302]

System Wide Information Management Spiral 2 will probably be renamed Phase 2 and will expand upon SWIM Phase 1 capabilities. It is in the process of being defined.

The SWIM program is undergoing a major realignment as of the spring 2006. Details will be forthcoming.

Mechanism: System Wide Information Management Spiral 3 (SWIM Spiral 3) [6303]

The System Wide Information Management (SWIM) program has been redesigned into phases rather than spirals. However it appears that later phases will extend the capabilities to include air-ground network integration. It includes integration of SWIM with the Aeronautical Telecommunication Network (ATN), Next Generation Air/Ground Communications (NEXGEN), Satellite Communications, Ground Based Transceivers (GBT), Traffic Information Service-Broadcast (TIS-B), and Flight Information Service-Broadcast (FIS-B).

The SWIM program is undergoing a major realignment as of the spring 2006. Details will be forthcoming.

Mechanism: Terminal Weather Information for Pilots (TWIP) [716]

The Terminal Weather Information for Pilots (TWIP) mechanism provides jetliner pilots with direct access to limited weather information from each of 46 TDWR sites via a commercial communications service provider. TWIP enables jetliner pilots of equipped aircraft to view a rough depiction of hazardous weather (heavy precip, windshear/microbursts) similar to what is displayed to Tower and TRACON controllers. TWIP functionaliy will be eventually subsumed into the Integrated Terminal Weather System (ITWS) and the Weather System Processor (WSP) after at those sites.

Mechanism: Tower Data Link System Refresh (TDLS Refresh) [686]

The Tower Data Link System (TDLS) automates tower-generated information for transmission to aircraft via data link. The TDLS interfaces with sources of local weather data and flight data and provides pilots with Pre-Departure Clearance (PDC), Digital-Automatic Terminal Information System (D-ATIS), and emulated Flight Data Input / Output (FDIO). The PDC helps tower clearance delivery specialists compose and deliver departure clearances. The Digital Automatic Terminal Information Service (D-ATIS) provides high reliability messages of runway and taxiway instructions, information on avionics equipment, frequency outages, and local weather conditions worldwide. The TDLS data is transmitted in text form via the Aircraft Communication and Reporting System (ACARS) to an ACARS-equipped aircraft for review and acknowledgment by the flight crew.

Incorporating D-ATIS into TDLS allows: (1) Real-time ATIS updates throughout the National Airspace System (NAS), (2) Text message printouts, vise hand written recordings, (3) Pilots to receive destination ATIS information, prior to take-off.

Video Communication

Voice Communication

Mechanism: Air/Ground Communications RFI Elimination (RFI ELIM) [1394]

The Radio Frequency Interference (RFI) Elimination Program supplies equipment and implementation funds to assist the regions in preventing, reducing or eliminating interference problems in the air-to-ground (A/G) communications environment. Products include linear power amplifiers (LPA), transmitter combiners, and receiver multicouplers. In addition, funds are provided to the regions to purchase a variety of filters needed to reduce or eliminate RFI. The RFI program is a collection of projects to improve communications for operational needs. These projects are mainly for correction of site specific deficiencies such as interference from amplitude modulation/frequency modulation (AM/FM) broadcast stations, and plastic welders. The reliability of communications between air traffic controllers and pilots as well as other controllers is vital to the safe operation of the air traffic control system.

RFI will not be segmented, since this project addresses RFI requirements as they surface across all domains.

Mechanism: Backup Emergency Communications (BUEC) [625]

The Backup Emergency Communications (BUEC) mechanism includes sustaining and replacing the existing analog BUEC system with an updated analog BUEC system. BUEC provides backup for Remote Communications Air-Ground Facility (RCAG) very high frequency (VHF) and ultra high frequency (UHF) communications channels (radio equipment) that are available to an Air Route Traffic Control Center (ARTCC) for immediate use if one or more primary RCAG frequencies fail. The system consists of remotely controlled equipment, and several VHF and UHF transceivers. A typical BUEC system may provide as many as 60 VHF and UHF transceivers for an ARTCC. For information on the predecessor, please refer to mechanism ID# 35.

Mechanism: Command and Control Communications (C3) [23]

The Command and Control Communications (C3) program provides the FAA the minimum command and control communications capability necessary to direct the management, operation, and reconstruction of the National Airspace System (NAS) during regional or local emergencies, when normal common carrier communications are interrupted. The C3 program also provides minimum capabilities for Continuity of Operations (COOP) for the FAA. C3 encompasses fourteen individual program elements, divided into phases. Phase I of the C3 program was for the High Frequency Single Side-Band (HF/SSB) upgrade which has been completed. Phase II focuses on the Defense Messaging System (DMS) and Secure Telephone Equipment (STE). Phase III encompasses the replacement of the Very High Frequency/Frequency Modulated (VHF/FM) system, and Phase IV will initiate the upgrade and maintenance of other critical communications, which includes HF radio equipment, secure conferencing system equipment, automated notification system replacement/upgrade, and satellite telephone network enhancements. Other efforts within the C3 program revolve around National Security and are classified.

Mechanism: Communication Facilities Enhancement - Expansion (CFE - Expansion) [6867]

The growth in air traffic operational requirements has historically dictated the need for greatly increased air/ground communications coverage. In response, this program was established to provide additional air/ground communications frequencies by establishing new, relocating existing, and/or expanding remote communications facilities (RCF). The Communications Facilities Enhancement (CFE) program conducts communications facilities work, purchases required equipment, and implements grounding, bonding, and testing to meet FAA facility specifications. The CFE program is responsible for establishing, expanding, or relocating air-ground radio communication facilities required to increase National Airspace System (NAS) capacity and improve NAS efficiency.

Mechanism: Conference Control System (CCS) [2453]

The Conference Control System (CCS) is a replacement system for the legacy Operational Telephone System (OTS). The CCS is a telecommunications conferencing system that provides voice connectivity, switching, and teleconferencing capabilities for the Traffic Management Specialists and the National Airspace System (NAS) Operations Manager, at the FAA David J. Hurley Air Traffic Control System Command Center (ATCSCC) in Herndon, VA. CCS enables communication from ATCSCC to Traffic Management Units (TMUs) at Air Route Traffic Control Center (ARTCC) and Terminal Radar Approach Control (TRACON) facilities, the Severe Weather Group at ARTCCs, FAA Regional Offices, FAA Headquarters, Airline Operations Centers (AOCs), and the general aviation (GA) community.

NOTE: If you are interested in the history of OTS, the predecessor, please enter mechanism ID #: 26 as the search term on the mechanism page.

Mechanism: Digital Voice Recorder System (DVRS/DVR2) [15]

The Digital Voice Recorder System (DVRS) is a 16-channel multichannel modular digital voice recorder and reproducer system. The digital voice recorder is utilized to record all air-to-ground (A/G) voice communications between air traffic controllers and pilots, and ground-to-ground (G/G) intra and interfacility communications between air traffic personnel. The reproducer is designed for playback of call files and reproducing call files that have been recorded on digital audio tape (DAT) onto a standard cassette tape. Call files can be searched for playback using channel, time/date, or a combination of both parameters. The reproducer provides the capability to playback-selected recording from the digital voice recorder for transcription, evaluation and training purposes. The digital voice recorder consists of a digital recorder unit (DRU), control workstation, two speakers, external alarm with optional Navstar Global Positioning System (GPS) antenna receiver, uninterruptible power supply (UPS), and an alternating current (AC) line conditioner (if required).

Digital Voice Recorder 2 (DVR2) utilizes 24-channel capacity analog to digital interface (ADIF) and audio line interface (ALI) boards in the DRU chassis. Eliminating one DAT drive and incorporating a mirrored hard drive configuration of dual 8 Gigabyte hard drives, and a mirroring device for mirroring control. The DVR2 increases the central processing unit (CPU) memory to 16 Megabyte (MB) and adds new cabling within the chassis for connection of the new channel capacity board, mirroring device and hard drive configuration. The DVR2 includes upgrades to the NICE software and workstation operating system.

Mechanism: Digital Voice Recorder System Replacement (DVRS Repl) [103]

The Digital Voice Recorder System Replacement (DVRS Repl) is a modern digital system used to record all communications by air traffic controllers in Airport Traffic Control

Tower (ATCT) facilities, Terminal Radar Approach Control (TRACON) facilities, Automated Flight Service Station (AFSS) facilities, and Air Route Traffic Control Center (ARTCC) facilities.

Voice communications between controllers, pilots, and other ground-based air traffic facilities are recorded for legal and accident investigation purposes.

Mechanism: Emergency Transceiver Replacement (ETR) [134]

The Emergency Transceiver (ETR) segment provides portable dual-band Ultra High Frequency/Very High Frequency (UHF/VHF) air-to-ground (A/G) radios for back up communications at Airport Traffic Control Tower (ATCT) and Terminal Radar Approach Control (TRACON) facilities. These new radios provide at least 30-minutes of operation on their battery pack. In addition, they can be operated from 12-volt direct current (VDC) vehicle power, as well as from an alternate 120-volt alternating current (VAC) source. When connected to an external antenna, they can be used from the controller position in case of catastrophic communications or power failure. They can also be carried out of the facility and operated with their own antennas when fire or some disaster forces building evacuation.

A five-year contract was awarded to Motorola in June 1994 for new Portable Emergency Transceiver Model 2000, (PET-2000) to replace a variety of obsolete, unsupportable radios that did not meet operational or spectral emission requirements. The radios were purchased with a ten-year warranty, training and logistic documentation. A total of 1,309 PET-2000s were delivered to the FAA Logistics Center (FAALC) from where they were shipped to locations throughout the National Airspace System (NAS). In addition to the radios, some of the regions were provided with antennas along with limited funds to cover the installation. Because the contract for the PET-2000 expired before sufficient funding could be obtained to satisfy the total replacement requirements and because a small number are needed each year for growth, steps are being taken to identify additional funding and a contract vehicle to acquire additional transceivers.

Mechanism: Emergency Voice Communications System (EVCS) [783]

The Emergency Voice Communications System (EVCS) was activated under a presidential mandate as a result of an airline emergency and the lack of dedicated emergency telecommunications required for such events. The EVCS makes use of designated channels within an FTS 2001 T1 "pipe" to provide "dedicated outgoing service channels" for emergency non-blocking outgoing call traffic management. In rare instances, a dedicated Federal Telecommunication System (FTS) central office telephone line, bypassing the private branch exchange (PBX), provides EVCS services. All current VTS System locations have EVCS connectivity but there are no plans to expand EVCS beyond the current configuration.

The EVCS is located at Headquarters (HQ), Regional Offices, several Air Route Traffic Control Centers (ARTCCs), Level 5 Terminal Radar Approach Control (TRACON) facilities, and other selected sites. EVCS uses two (2) dedicated FTS2001 dial access channels at most FAA locations. Dedicated dial lines using the Public Switched Telephone Network (PSTN) are used at locations not having direct access to FTS2001. Supports HQ and Regional Communications Command Centers"" functions for accident and incident reports, hijacks, aircraft crashes, aviation security matters, military activities, natural disasters, etc.

Mechanism: Enhanced Terminal Voice Switch (ETVS) [16]

The Enhanced Terminal Voice Switches (ETVS) are installed at Airport Traffic Control Tower (ATCT) and Terminal Radar Approach Control (TRACON) facilities with more than four air traffic controller positions. The ETVS is a modular system. The size of the switch is based on the number of controller positions in the facility.

The ETVS (installed in the ATCT) provides the air traffic control (ATC) operational ground-to-ground (G/G) voice communications interconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and TRACON controllers/Air Route Traffic Control Center (ARTCC) controllers/Flight Service Station (FSS) specialists/David J. Hurley Air Traffic Control System Command Center (ATCSCC) specialists. Air-to-ground (A/G) radio connectivity between ATCT controllers and pilots is also supported by the ETVS.

The ETVS (installed in the TRACON) provides the ATC operational G/G voice communications interconnectivity between controllers within a TRACON (intercom), interconnectivity between controllers in separate TRACONs (interphone), and interconnectivity between TRACON controllers and ATCT controllers/ARTCC controllers/FSS specialists/ATCSCC specialists. A/G radio connectivity between TRACON controllers and pilots is also supported by the ETVS.

A refined set of ETVS products is being procured through the Interim Voice Switch Replacement (IVSR) contract until 2010.

Mechanism: Future Communications Infrastructure - Phase 1 (FCI-P1) [6895]

The Future Communications Infrastructure (FCI) consists of ground human-machine interfaces (HMI), voice switches, automation systems, ground communications systems, routers, networks, radio ground stations, communication end systems, avionics (e.g., airborne communications management units (CMU)), and ground data link application processors. These components, combined in an end-to-end chain must meet the required performance and safety for voice and data applications that meet the initial requirements for the Next Generation Air Traffic System (NGATS) as referred to in the Final Concepts Communications Operating Concepts and Requirements (COCR) Version 1. FCI includes all the components needed for Air Traffic Service Providers (ATSP), Aeronautical Operational Control (AOC), and individual aircraft to communicate with each other. The FCI is what is referred to in the Communications Roadmap as the Digital VHF Aero-Mobile Comm. component. The Future Radio System is a subcomponent of FCI.

Mechanism: Future Radio System - Phase 1 (FRS-P1) [6909]

The Future Radio System (FRS), a subset of the Future Communications Infrastructure (FCI), is used to refer to the physical implementation of the radio components, including the avionics, of a communication system that is a combination of technologies that meet the initial requirements for the Next Generation Air Traffic System (NGATS) as referred to in the Final Concepts Communications Operating Concepts and Requirements (COCR) Version 1 as Phase 1. The scope of the FRS comprises Air-to-Ground and Air-to-Air communications. The FRS is what is referred to in the Avionics Roadmap as the Air/Ground Communications System Infrastructure component.

Mechanism: High Frequency Communications (HF Communications) [2345]

High Frequency (HF) communications is used by oceanic and en route facilities that support air traffic control (ATC) services for aircraft flying over oceanic airspace. A commercial communications service provider (CCSP) provides the HF communications service.

Mechanism: Integrated Communications Switching System Type I (ICSS I) [18]

The Integrated Communications Switching System Type I (ICSS I) are installed at Airport Traffic Control Tower (ATCT) facilities, Terminal Radar Approach Control (TRACON) facilities, and Automated Flight Service Station (AFSS) facilities.

The ICSS I (installed in the ATCT) provides the air traffic control (ATC) operational ground-ground voice communications interconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and TRACON controllers/Air Route Traffic Control Center (ARTCC) controllers/ Flight Service Station (FSS) specialists/David J. Hurley Air Traffic Control System Command Center (ATCSCC) specialists. Ground-air radio connectivity between ATCT controllers and pilots is also supported by the ICSS I.

The ICSS I (installed in the TRACON) provide the ATC operational ground-ground voice communications interconnectivity between controllers within TRACON (intercom), interconnectivity between controllers in separate TRACONs (interphone), and interconnectivity between TRACON controllers and ATCT controllers/ARTCC controllers/FSS specialists/ATCSCC specialists. Ground-air radio connectivity between TRACON controllers and pilots is also supported by the ICSS I.

The ICSS I (installed in the AFSS) provides the ATC operational ground-ground voice communications interconnectivity between specialists within an AFSS (intercom), interconnectivity between specialists in separate AFSSs (interphone), and interconnectivity between FSS specialists and ARTCC controllers/TRACON controllers/ATCT controllers/ATCSCC) specialists. Ground to-air radio connectivity between AFSS specialists and pilots is also supported by the ICSS I.

Mechanism: Integrated Communications Switching System Type II (ICSS II) [2312]

The Integrated Communications Switching Systems Type II (ICSS II) are installed at Airport Traffic Control Towers (ATCT), Automated Flight Service Stations (AFSS), and Terminal Radar Approach Control (TRACON) facilities.

The ICSS II (installed in the ATCT) provides the air traffic control (ATC) operational ground-ground voice communications interconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and TRACON controllers/Air Route Traffic Control Center (ARTCC) controllers/Flight Service Station (FSS) specialists/David J. Hurley Air Traffic Control System Command Center (ATCSCC) specialists. Ground-to-air radio connectivity between ATCT controllers and pilots is also supported by the ICSS II.

The ICSS II (installed in the TRACON) provides the air traffic control (ATC) operational ground-to-ground (G/G) voice communications interconnectivity between controllers within TRACON (intercom), interconnectivity between controllers in separate TRACONs (interphone), and interconnectivity between TRACON controllers and ATCT controllers/Air Route Traffic Control Center (ARTCC)) controllers/Flight Service Station (FSS) specialists/ATCSCC specialists. Ground-to-air radio connectivity between TRACON controllers and pilots is also supported by the ICSS II.

Mechanism: Integrated Communications Switching System Type III (ICSS III) [2313]

The Integrated Communications Switching System Type III (ICSS III) is installed at Automated Flight Service Stations (AFSS). The ICSS III (installed in the AFSS) provides the air traffic control (ATC) operational ground-to-ground (G/G) voice communications interconnectivity between specialists within an AFSS (intercom), interconnectivity between specialists in separate AFSSs (interphone), and interconnectivity between Flight Service Station (FSS) specialists and Air Route Traffic Control Center (ARTCC) controllers/Terminal Radar Approach Control (TRACON) controllers/Airport Traffic Control Tower (ATCT) controllers/David J. Hurley Air Traffic Control System Command Center (ATCSCC) specialists. Air-to-ground (A/G) radio connectivity between AFSS specialists and pilots is also supported by the ICSS III.

The A-76 Study will address these switches; the requirements are embedded in the Flexible Voice Switch initial requirements document. Note also that on February 1, 2005, the FAA awarded a contract for the services provided by the 58 Automated Flight Service Stations (AFSSs) in the Continental United States, Puerto Rico, and Hawaii to the Lockheed Martin Corporation. Lockheed Martin assumed responsibility for providing AFSS flight services on October 4, 2005. The program is called Flight Service 21 (FS21). With continued FAA oversight, Lockheed Martin will maintain deliverance of flight services according to the FAA""""s strict safety and service requirements. Additional information can be found at http://www.lmafsshr.com.

Mechanism: Multi-Channel Recording System (MCR) [20]

The Multi-Channel Recording System (MCRS) records all audio information either transmitted or received by selected Airway Facilities (AF) and Air traffic (AT) control positions. The Digital Voice Recorder System/Digital Voice Recording System Series 2 (DVRS/DVR2) program, replaced most of the MCRS units in the National Airspace System (NAS); however, 25 units remain at the time of writing. The MCRS consists of four Magnasync TR-1710 10-channel recorders; one Magnasync TR-1720 20-channel recorder; thirteen Dictaphone Model-5000 recorders (ten 10-channel & 3 20-channel); four high capacity voice recorders (three 60-channel & one 10-channel); and three other solid-state recorders (two 60-channel and one 20-channel).

Mechanism: Multi-Mode Digital Radios (MDR) [2014]

Multi-Mode Digital Radios (MDRs) are ground-based very high frequency (VHF) air traffic-control (ATC) radios that can operate in several configurations: (1) analog voice with 25 kHz channel spacing; (2) analog voice with 8.33 kHz channel spacing; and (3) VHF Data Link (VDL) Mode 3 which consists of two-way digital voice and data communication.

Implementation of these radios are scheduled in two phases: (1) En Route Facilities - 13,000 MDRs by the end of 2013 and (2) Terminal Facilities - ~15,000 MDRs by the end of 2020.

Mechanism: NAS Voice Switch (NVS) [6328]

Voice communications is the primary means of communications among air traffic control (ATC) facilities and between an ATC specialist and a pilot. Voice switching provides the ATC specialist both ground-to-ground (G/G) interfacility/intrafacility and air-to-ground (A/G) voice communications connectivity.

The National Airspace System (NAS) Voice Switch (NVS) program will replace aging voice switches and their analog interfaces with modern digital voice switches consisting of digital interfaces. The NVS will be the common platform and baseline voice switch for all NAS domains with modularity and scalability to meet communications connectivity requirements. Additionally, this switch will be expandable to accommodate growth capacity requirements and able to support NAS Modernization needs as described in various Operational Improvements (OIs).

Mechanism: Radio Control Equipment Sustainment (RCE Sustain) [7368]

The Radio Control Equipment (RCE) program replaces radio signaling and tone control equipment. The equipment is located at all Air Route Traffic Control Center (ARTCC) facilities, Remote Center Air/Ground Communications (RCAG) facilities, air traffic control (ATC) facilities, Remote Transmitter Receiver (RTR) sites, Flight Service Station (FSS) facilities and Remote Control Outlets (RCO). The FY 2008 plans are to sustain and/or procure RCE to support 600 channels (1,200 units).

Mechanism: Rapid Deployment Voice Switch Type I (RDVS I) [19]

The Rapid Deployment Voice Switch Type I (RDVS I) is installed at Airport Traffic Control Towers (ATCT) and Terminal Radar Approach Control (TRACON) facilities with more than four air traffic controller positions. The RDVS is a modular system. The size of the switch is based on the number of controller positions in the facility. The RDVS I (installed in the ATCT) provides the air traffic control (ATC) operational ground-to-ground (G/G) voice communications interconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and TRACON controllers/Air Route Traffic Control Center (ARTCC) controllers/ Flight Service Station (FSS) specialists/David J. Hurley Air Traffic Control System Command Center (ATCSCC) specialists. Air-to-ground (A/G) radio connectivity between ATCT controllers and pilots is also supported by the RDVS I.

The RDVS I (installed in the TRACON) provides the ATC operational G/G voice communications interconnectivity between controllers within an TRACON (intercom), interconnectivity between controllers in separate TRACONs (interphone), and interconnectivity between TRACON controllers and ATCT controllers/ARTCC controllers/FSS specialists/ATCSCC specialists. A/G radio connectivity between TRACON controllers and pilots is also supported by the RDVS I.

Mechanism: Rapid Deployment Voice Switch Type II (RDVS II) [24]

The Rapid Deployment Voice Switch Type II (RDVS II) is installed at Airport Traffic Control Towers (ATCT) and Terminal Radar Approach Control (TRACON) facilities with more than four air traffic controller positions. The RDVS is a modular system. The size of the switch is based on the number of controller positions in the facility. The RDVS II (installed in the ATCT) provides the air traffic control (ATC) operational ground-to-ground (G/G) voice communications interconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and TRACON controllers/Air Route Traffic Control Center (ARTCC) controllers/Flight Service Station (FSS) specialists/David J. Hurley Air Traffic Control System Command Center (ATCSCC) specialists.

Air-to-ground (A/G) radio connectivity between ATCT controllers and pilots is also supported by the RDVS II. The RDVS II (installed in the TRACON) provides the ATC operational G/G voice communications interconnectivity between controllers within an TRACON (intercom), interconnectivity between controllers in separate TRACONs (interphone), and interconnectivity between TRACON controllers and ATCT controllers/ARTCC controllers/FSS specialists/ATCSCC specialists. A/G radio connectivity between TRACON controllers and pilots is also supported by the RDVS II.

Mechanism: Rapid Deployment Voice Switch Type IIA (RDVS IIA) [2315]

The Rapid Deployment Voice Switch Type IIA (RDVS IIA) is installed at Airport Traffic Control Tower (ATCT) facilities, Terminal Radar Approach Control (TRACON) facilities with more than four air traffic controller positions. The RDVS is a modular system. The size of the switch is based on the number of controller positions in the facility.

The RDVS IIA (installed in the ATCT) provides the air traffic control (ATC) operational ground-to-ground (G/G) voice communications interconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and TRACON controllers/Air Route Traffic Control Center (ARTCC) controllers/Flight Service Station (FSS) specialists/David J. Hurley Air Traffic Control System Command Center (ATCSCC) specialists.

The RDVS IIA also supports air-to-ground (A/G) radio connectivity between ATCT controllers and pilots. The RDVS IIA (installed in TRACON facilities) provides the ATC operational G/G voice communications interconnectivity between controllers within a TRACON (intercom), interconnectivity between controllers in separate TRACONs (interphone), and interconnectivity between TRACON controllers and ATCT controllers/ARTCC controllers/FSS specialists/ATCSCC specialists. A/G radio connectivity between TRACON controllers and pilots is also supported by the RDVS IIA.

Mechanism: Satellite Communications (SATCOM) [2346]

Satellite Communications (SATCOM) is used by oceanic and en route facilities to support an alternative means of tactical air traffic control (ATC) voice communications between ground controllers and pilots in aircraft over the ocean. Oceanic air-to-ground satellite communications is provided via a Commercial Communications Service Provider (CCSP). The FAA currently has no plans to develop or implement its own oceanic air to ground SATCOM service.

There are also satellite transceivers installed at regional facilities and used as an alternate means of communications in case of total ground communications failure or between locations in mountainous terrain or where other means of communications are not possible such as the Alaska National Airspace System (NAS) Interfacility Communications System (ANICS).

Mechanism: Small Tower Voice Switch (STVS) [25]

The Small Tower Voice Switch (STVS) is installed in small Airport Traffic Control Tower (ATCT) facilities and in Flight Service Station (FSS) facilities. The basic STVS has four operator positions. The STVS provides the air traffic control (ATC) operational ground-to-ground (G/G) voice communications interconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and Air Route Traffic Control Center (ARTCC) controllers/ Terminal Radar Approach Control (TRACON) controllers/FSS specialists/David J. Hurley Air Traffic Control System Command Center (ATCSCC) specialists.

Air-to-ground (A/G) radio connectivity between ATCT controllers and pilots is also supported by the STVS. The STVS (installed in the FSS) provides the ATC operational G/G voice communications interconnectivity between specialists within an FSS (intercom), interconnectivity between specialists in separate FSSs (interphone), and interconnectivity between FSS specialists and ARTCC controllers/TRACON controllers/ATCT controllers/ATCSCC specialists.

Air-to-ground radio connectivity between FSS specialists and pilots is also supported by the STVS.

Mechanism: Ultra High Frequency Ground Radios (UHF Ground Radios) [2243]

Ultra high frequency (UHF) Ground Radios are analog UHF amplitude modulation (UHF - AM) radio devices operating in the 225 - 400 MHz frequency band, which are single channel transmitters and receivers operating in a main/standby configuration. These ground-based devices support tactical air traffic control (ATC) via voice communications and coordination between the ground-based controller and the military pilot in military aircraft in the Oceanic, En Route, Terminal, and Flight Service Station (FSS) domains.

Mechanism: Ultra High Frequency Ground Radios - Replacement (UHF Ground Radios - Relp) [626]

The Ultra High Frequency Ground Radios-Replacement (UHF Ground Radios-Repl) mechanism represents analog, ultra high frequency, amplitude modulation (UHF-AM) radio devices operating in the 225-400 MHz frequency band which are single channel transmitters and receivers operating in a main/standby configuration. These ground-based devices support tactical air traffic control (ATC) via voice communications and coordination between the ground-based controller and the military pilot in military aircraft in the oceanic, en route, terminal, and Flight Service Station domains.

Mechanism: VSCS Training and Backup System Expansion (VTABS Expansion) [7353]

Note: The Voice Switching and Control System (VSCS) program office is seeking a final investment decision (FID) with the FAA Joint Resources Council (JRC) in August 2006.

The VSCS Training and Backup System (VTABS) Expansion segment is intended to meet the operational need for sector expansion in the En Route domain in order to support the NAS (National Airspace System) Operational Evolution Plan (OEP) and Choke Point initiatives. New capacity requirements in the current VATBS will expand the system from 50 positions/190 frequencies to 90 positions/319 frequencies. Final approval of the VTABS Expansion program is still pending ATS-1 approval and NAS Capital Investment Plan (CIP) funding.

Mechanism: Very High Frequency Ground Radios (VHF Ground Radios) [303]

Very High Frequency (VHF) Ground Radios are analog VHF amplitude modulation (VHF - AM) radio devices operating in the 118 - 137 MHz frequency band which are single-channel transmitters and receivers operating in a main/standby configuration. These ground-based devices support tactical air traffic control (ATC) via voice communications and coordination between the ground-based controller and the pilot in commercial, cargo, or general aviation aircraft in the oceanic, en route (i.e., Air Route Traffic Control Center (ARTCC)), terminal (i.e., Terminal Radar Approach Control (TRACON)/Airport Traffic Control Tower (ATCT)), and Flight Service Station domains. Additionally, there are analog VHF frequency modulation (VHF - FM) radio devices operating in the 161 - 174 MHz frequency band that are multi-channel transceivers. These transceivers are used by Flight Inspection, Aviation Security, and Airway Facilities specialists supporting local airport operations and maintenance or to perform their operational maintenance mission in support of the National Airspace System (NAS). However, these same VHF-FM transceivers are also used to support the resolution of emergency situations or establish a level of voice command and control communications/coordination during disaster recovery.

Mechanism: Very High Frequency/Ultra High Frequency Emergency Communications Transceivers - Terminal (VHF/UHF ECT - Terminal) [2344]

Very High Frequency/Ultra High Frequency Emergency Communications Transceivers - Terminal (VHF/UHF ECT - Terminal) are analog VHF and UHF transceivers operating in either the 118 - 137 MHz or 225 - 400 MHz frequency bands. These transceivers are used in the terminal domain as emergency communications.

Mechanism: Voice Switching and Control System (VSCS) [7354]

Note: The Voice Switching and Control System (VSCS) program office is seeking a final investment decision (FID) with the FAA Joint Resources Council (JRC) in August 2006.

The Voice Switching and Control System (VSCS) provides the Air Route Traffic Control Center (ARTCC) air traffic controller with ground/ground voice switching interfacility and intrafacility communications and remote control access to air/ground radio equipment for controller-to-pilot communications. The VSCS replaced the aging ground-to-ground switching equipment and the air-to-ground circuits with a single integrated, computer-controlled, digital voice switching system, which greatly improves air traffic safety with clearer voice communications. The VSCS provided as government furnished property (GFP) communications requirement for inclusion in the common console in the Display System Replacement (DSR). Delivery and implementation of the VSCS Training and Backup System (VTAB) and VSCS Console Equipment (VCE) will be completed.

Mechanism: Voice Switching and Control System Modification (Control Subsystem Upgrade) (VCSU) [2460]

The Voice Switching and Control System (VSCS) Control Subsystem Upgrade (VCSU) is a replacement of the Tandem computers that perform the logical switching and control for the VSCS system. The upgrade replaces the program's original control subsystem computers and software with modern, commercial off-the-shelf (COTS) servers running Microsoft Windows 2000 advanced server software. The FAA plans to merge the VCSU with other software enhancements prior to beginning a national rollout of the upgrade to the nation's 21 Air Route Traffic Control Center (ARTCC) facilities. These upgrades will ensure that the air-to-ground and ground-to-ground communications capabilities are reliable and available for separating aircraft, coordinating flight plans, and transferring information between air traffic control (ATC) facilities in the en route environment. Harris Corporation completed the Functional Acceptance Test (FAT) of the VCSU in November 2001.

By the end of Fiscal Year 2004 the VCSU was operational at all 21 ARTCC facilities. The FAA also procured equipment to replace the Contractor Traffic Simulation Unit (CTSU) test bed located at the FAA William J. Hughes Technical Center (WJHTC), which is used to perform system-loading requirements for all formal baseline verifications of VSCS functions.

Mechanism: Voice Switching and Control System Modification (Technological Refresh) (VSCS Mod (Tech Refresh)) [2253]

The technological refresh (TR) for the Voice Switching and Control System (VSCS) is a service life extension. The TR encompasses 1) Video Display Module Replacement (VDMR) - procurement and installation, 2) Power Supply Refurbishment - ongoing depot repair actions, and 3) Workstation Upgrade - production and installation. Software development demonstration and system expansion are being considered for the 2008 timeframe.

The VSCS is installed in the Air Route Traffic Control Center (ARTCC). The VSCS is a modular system the size of the switch is based on the number of controller positions in the facility.

The VSCS provides the Air Traffic Control (ATC) operational ground-to-ground (G/G) voice communications interconnectivity between controllers within an ARTCC (intercom), interconnectivity between controllers in separate ARTCCs (interphone), and interconnectivity between ARTCC controllers and Terminal Radar Approach Control (TRACON) controllers/Airport Traffic Control Tower (ATCT) controllers/Flight Service Station (FSS) specialists/David J. Hurley Air Traffic Control System Command Center (ATCSCC) specialists. Air-to-ground (A/G) radio connectivity between ARTCC controllers and pilots is also supported by the VSCS.

Mechanism: Voice Switching and Control System Training and Backup Switches (VTABS) [1736]

Voice Switching and Control System Training and Backup Switch (VTABS) was developed to meet AT requirements for a separate standalone VSCS Backup and Training System. VTABS can be configured as a 50-position switch with the capability to support air traffic operations in the event of VSCS failure, hardware and software maintenance or power loss.

WAN Communication

Mechanism: Aeronautical Telecommunication Network Ground to Ground Router (ATN G/G Router) [642]

The Aeronautical Telecommunication Network (ATN) is an evolving global data Internet infrastructure developed by the International Civil Aviation Organization (ICAO). The ATN will be comprised of an interconnection of computers with gateways or routers via real sub-networks. This allows the construction of a homogeneous virtual data network in an environment of administrative and technical diversity. Given the desire to interconnect an evolving and ever wider variety of aircraft and ground-based computers to accomplish air traffic management, it is clear that the civil aviation community needs a global data Internet.

The ATN design allows communications services for different user groups; i.e., Air Traffic Services (ATS), Aeronautical Operational Control (AOC), Aeronautical Administrative Communications (AAC), and Aeronautical Passenger Communications (APC). The design provides for the incorporation of different air-to-ground sub-networks and different ground-to-ground sub-networks (e.g., AFS, Aerospace Medical Certification Subsystem (AMCS)), resulting in a common data transfer service. These two aspects are the basis for interoperability of the ATN and will provide a reliable data transfer service for all users. The design is such that user communications services can be introduced in an evolutionary manner.

This paragraph provides historical information. The ground-to-ground application, ATS Message Handling System (AMHS), is adopted by the ICAO member states to replace the existing Aeronautical Fixed Telecommunication Network (AFTN) that is currently being host by NADIN Message Switching Network (MSN). The trial with Japanese Civil Aviation Bureau (JCAB) has been completed in 2000. The plan was to have the AMHS service commissioned by March 2004. The ATN router is under the FAA Telecommunications Infrastructure (FTI) contract while the AMHS is under FAA control. The upgrade of AFTN with other states includes Australia, Fiji, New Zealand and other states in the Caribbean/South America (CAR/SAM) region is planned for 2004 through 2007.

The scope of the analysis is limited to the Ground-to-Ground (G-G) services and infrastructure of the ATN. Analysis of the Air-to-Ground (A-G) portion will be reserved for a future effort. Currently the only application being deployed on ATN is the AMHS connection from Salt Lake City (SLC) to Japan, which is designed to replace existing AFTN service.

Mechanism: Agency Data Telecommunications Network 2000 (ADTN2000) [97]

The Agency Data Telecommunications Network - 2000 (ADTN2000) is the FAA''s wide area network (WAN) serving over 800 FAA sites and providing dial access for approximately 4000 active remote users. It is used for day-to-day agency business management (e.g. payroll, personnel, and e-mail) and to serve some National Airspace System (NAS) systems/applications designated as mission support.

ADTN2000 is a private FAA WAN comprised of a high-level network backbone layer and a user access layer. The backbone layer includes nodes at major FAA locations interconnected by Permanent Virtual Circuits (PVC) across a Frame Relay cloud. It provides high-speed data transport and alternate path routing among the nodes. The user access layer, which employs the backbone for routing and long haul connectivity, includes user interface equipment and leased circuits between the user end points and the nearest backbone node.

ADTN2000 supports international FAA sites via gateways to a global Virtual Private Network (VPN). Users at four major FAA international offices have dedicated connectivity to the VPN and are automatically routed to the ADTN2000 international gateway. Smaller international sites and individuals have access to ADTN2000 via dial-up service provided by the VPN.

Mechanism: Alaskan National Airspace System Interfacility Communications System (ANICS) [12]

Alaskan National Airspace System Interfacility Communications System (ANICS) uses FAA-owned satellite earth stations and leased transponders on communications satellites to provide reliable telecommunication services. The ANICS equipment provides remote maintenance monitoring and control. The equipment is controlled and operated from the Network Operations Control Center (NOCC), centrally located in the Anchorage (KZAN) Air Route Traffic Control Center (ARTCC).

ANICS Phase I sites provided critical communications with 99.99% availability by using two sets of equipment and two satellites in parallel.

ANICS Phase II sites will provide essential communications with 99.9% availability by using one set of equipment and one satellite. ANICS Phase II uses commercial off-the-shelf (COTS) equipment in a redundant configuration to provide high availability and reliability. Phase II sites are enclosed in radomes that protect the equipment and antenna from the weather.

Mechanism: Alaskan National Airspace System Interfacility Communications System Phase II (ANICS Phase II) [6531]

The Alaskan National Airspace System Interfacility Communications System Phase II (ANICS Phase II) sites will provide essential communications with 99.9% availability by using one set of equipment and one satellite. The ANICS Phase II system uses commercial off-the-shelf (COTS) equipment in a redundant configuration to provide high availability and reliability. The ANICS Phase II sites are enclosed in radomes that protect the equipment and antenna from the weather.

Mechanism: Bandwidth Manager (BWM) [777]

Bandwidth Manager (BWM) provides capacity for multiple communication services and the ability to multiplex voice and data within the National Airspace System (NAS) telecommunications network. The BWM enhanced the NAS network capabilities by providing bandwidth-on-demand, automatic restoration, switching and intelligent routing of services between owned and/or leased services.

As of 10/27/2005, decommissioning has not started. Projected dates have been added showing an adjustment of two years from the original (20-Mar-2004)and will be updated once the FAA Telecommunications Infrastructure (FTI) program office provides current status.

Mechanism: Data Multiplexing Network (DMN) [13]

The Data Multiplexing Network (DMN) mechanism multiplexes a number of independent data streams for consolidation into a single transmission channel. The DMN equipment will work with a variety of transmission systems, such as analog and digital leased channels, voice-grade dial-up circuits, Radio Communications Link (RCL) channels, Low Density RCL, and satellites.

As of December 2005, decommissioning had not started. Projected dates have been added showing an adjustment of two years from the original (20 March 2004).

Mechanism: En Route Communications Gateway (ECG) [382]

The En Route Communications Gateway (ECG) replaces the Peripheral Adapter Module Replacement Item (PAMRI) and provides a modernized local area network (LAN)-based infrastructure capable of accommodating the En Route Automation Modernization (ERAM) program with minimal modifications. The PAMRI functions to be replaced included providing communication interfaces to external systems located in other Air Route Traffic Control Centers (ARTCCs), Terminal Radar Approach Control (TRACON) facilities, Automated Flight Service Stations (AFSSs), David J. Hurley Air Traffic Control System Command Center (ATCSCC), North American Aerospace Defense Command (NORAD), U.S. Law Enforcement, U.S. Customs, Military Base Operations, and international Area Control Centers (ACCs). Other interfaces include the Flight Data Input/Output (FDIO) Central Control Unit, which exchanges FDIO data with FAA and U.S. Department of Defense (DoD) facilities, and the National Airspace Data Interchange Network (NADIN) concentrator, which exchanges data through the NADIN Packet Switched Network (PSN) with the M1FC via the Weather Message Switching Center Replacement (WMSCR). The ECG increases the number of external interfaces to radars from 24 to 36. The ECG provides internal interfaces between the Host Computer System (HCS) and the Direct Access Radar Channel (DARC), or EBUS, and between HCS and traffic flow processors such as the Enhanced Traffic Management System (ETMS) and Departure Spacing Processor (DSP), both of which eventually will transition from ECG to the Host Interface Device/National Airspace System Local Area Network (HID/NAS LAN) system. The ECG Monitor and Control (M&C) subsystem includes a display for monitoring up to two-dozen radars. This display is called the Random Access Plan Position Indicator (RAPPI).

The operational components of ECG consist of: (a) front-end processor (communications and surveillance interfaces), (b) two gateway processors (internal connectivity to HCS and DARC/ Enhanced Backup Surveillance (EBUS)), (c) LANs that communicate between the front-end and gateway processors on the primary and the backup automation systems, and (d) a monitor and control processor. With replacement of DARC by EBUS, the ECG gateway processor is renamed to the Backup Interface Processor (BIP), with the BIP platform housing both the ECG gateway application and the EBUS application.

As of October 27, 2005 the ECG was operational at all 20 ARTCCs, with the final site (Miami Center (KZMA)) declared an Operational Readiness Date (ORD) on October 19, 2005.

Mechanism: En Route Communications Gateway Technology Refresh (ECG Tech Refresh) [6389]

The En Route Communications Gateway Technology Refresh (ECG Tech Refresh) will enable ECG to accommodate the En Route Automation Modernization (ERAM) system. It will replace processors previously interfaced to the Host Computer System (HCS) and the Enhanced Backup Surveillance (EBUS) with processors to be interfaced with ERAM primary and backup Application Infrastructure local area networks (LANs). Whereas ECG previously did not pass flight data to the backup channel (Direct Access Radar Channel (DARC)/EBUS), ECG must pass both surveillance and flight data to the backup channel of ERAM to enable full functionality on both channels of ERAM. To assure flight data is directed to only one channel at a time (not both), a new switching capability will be added to control the flow of flight data to either the primary or backup channel.

The ECG Tech Refresh will also accommodate new interfaces, including those previously provided by the Host Interface Device National Airspace System LAN (HID NAS LAN) for Controller-Pilot Data Link Communications (CPDLC), those previously provided by URET for interfacing with adjacent ARTCCs and with WARP, and those provided for interfacing with the U.S. Customs. Whereas the original ECG maintained legacy serial and parallel interfaces, the ECG Tech Refresh will (where possible) migrate from legacy interfaces to network interfaces, resulting in replacement of some serial and parallel interfaces. The ECG Tech Refresh will also provide a new Monitor and Control (M&C) sub-system for compatibility with the ERAM M&C and to assure successful integration with the future En Route Monitor and Control (EMAC).

Mechanism: FAA Bulk Weather Telecommunications Gateway (FBWTG) [699]

The FAA Bulk Weather Telecommunications Gateway (FBWTG) provides the FAA interface to the National Weather Service (NWS) for the acquisition of gridded model weather forecasts and airborne weather observations (from the Meteorological Data Collection and Reporting System (MDCRS)) used by WARP and ITWS. It also provides a communications gateway for receiving weather advisories/information of hazardous products from the Aviation Weather Center in Kansas City, MO.

Mechanism: FAA Telecommunications Infrastructure (FTI) [639]

The FAA Telecommunications Infrastructure (FTI) services will replace most FAA-owned and leased telecommunications systems/services and consolidate their functions under a single service provider. The FTI contract, awarded to the Harris Corp. on July 15, 2002, will provide services that will meet current and future FAA and National Airspace System (NAS) telecommunications requirements while reducing operational costs.

FTI is implemented in two phases. Phase 1 focuses on establishing an Internet Protocol (IP) backbone among 27 sites that includes Air Route Traffic Control Centers (ARTCCs), David J. Hurley Air Traffic Control System Command Center (ATCSCC), Volpe National Transportation Systems Center (Volpe Center), FAA Mike Monroney Aeronautical Center (MMAC), FAA William J. Hughes Technical Center (WJHTC), and the two National Airspace Data Interchange Network (NADIN) National Network Control Centers (NNCCs). Its primary goal is to transition 25 major nodes from the Leased Interfacility NAS Communications System (LINCS) network.

Phase 2 transitions circuits from Data Multiplexing Network (DMN), Bandwidth Manager (BWM), NADIN Packet-Switched Network (PSN), and any remaining LINCS circuits.

FTI is a 15-year contract, which began in FY 2002 and runs through FY 2017.

Additional information at http://www.faa.gov/programs/fti/main.htm

Mechanism: Federal Aviation Administration Telecommunications Satellite (FAATSAT) [530]

The Federal Aviation Administration Telecommunications Satellite (FAATSAT) is a leased service alternative path for primary interfacility telecommunications circuits, using circuit diversity to avoid single point-to-point failure. FAATSAT serves the continental United States, Puerto Rico, Hawaii, and the Virgin Islands. The FAATSAT network management system consists of 21 FAA hub sites and 256 hub-linked remote sites. A System Management Terminal (SMT) at each hub site provides operators with a read-only regional display view of the status of the FAA network. A communications server at each hub site interfaces with all the devices within a hub region to provide fault, configuration, performance, and security management functionality to the Satellite Control Centers (SCCs) at McLean, Virginia, and Cary, North Carolina.

Mechanism: Federal Telecommunications System 2001 (FTS 2001) [629]

Federal Telecommunications System 2001 (FTS 2001) provides for a follow-on lease for FTS 2000 functions. The telecommunications service contract that will provide administrative and National Airspace System (NAS) telecommunications support for the FAA. FTS 2001 will provide long distance voice, facsimile, video, and data services.

Mechanism: High Frequency Aeronautical Telecommuniction Network Data Link (HF ATN DL) [785]

The High Frequency Aeronautical Telecommunication Network Data Link (HF ATN DL) provides two-way digital data communications over HF radios using International Civil Aviation Organization (ICAO) - compliant ATN digital data link applications in the transoceanic domain. A Commercial Communications Service Provider (CCSP) provides this service. The FAA has no plans to develop its own HF ATN data communications system.

Mechanism: Interfacility Communications (Interfacility Comm) [694]

Interfacility Communications (Interfacility Comm) includes all interfacility ground-to-ground communications systems connecting FAA facilities. It will replace the FAA Telecommunications Infrastructure (FTI) services when it expires. The Interfacility Comm will provide services that will meet future FAA and National Airspace System (NAS) telecommunications requirements in preparation for or in support of the Next Generation Air Transportation System (NGATS) vision and requirements.

Mechanism: Leased Inter-facility National Airspace System Communication System (LINCS) [67]

The Leased Inter-facility National Airspace System Communication System (LINCS) provides transmission channels of various industry-standard types between any specified end points, used to satisfy all FAA operational and some administrative telecommunication requirements.

Mechanism: Low-Density Radio Communications Link (LDRCL) [66]

The Low-Density Radio Communications Link (LDRCL) is an FAA owned Low-Density Radio Communications Link (LDRCL) satisfies short-haul, low-density communication requirements. It provides user access (via tail circuits) to a Radio Communications Link (RCL) site or connectivity between two operational facilities.

Mechanism: National Airspace Data Interchange Network Message-Switched Network (NADIN MSN) [61]

The National Airspace Data Interchange Network Message-Switched Network (NADIN MSN) (sometimes called NADIN 1A) is an integrated store-and-forward telecommunication system consisting of message-switched networks, accessed by remote concentrators. NADIN MSN provides flight plan, weather, and Notice to Airmen (NOTAM) information, and meets the International Civil Aviation Organization (ICAO) requirements for Aeronautical Fixed Telecommunication Network (AFTN) support.

Because of changes in the earlier plans of Host Computer System (HCS)-related and other en route automation systems, the legacy protocols supporting connections between the HCS and NADIN have not been replaced by newer technologies. Recently, talks have resumed with both the En Route Automation Modernization (ERAM) and the En Route Communications Gateway (ECG) Program Offices, to try and come up with possible solutions to eliminate a piece of the NADIN MSN Concentrator equipment called the NAS/Host Interface Adapter. These discussions are in the preliminary stages and are addressing possible upgrades in the next few years. Several hurdles need to be overcome to get approved funding for the proposed changes.

Meanwhile, the NADIN MSN switches, located at ATL and SLC NNCCs, are already in the process of transition. The NADIN MSN Rehost (NMR) has been cut over at SLC in February 2006 and ATL last month. The old and new systems will operate in parallel for about a year or so, with a few users at a time being cut over from the old MSN Switches to NMR. Concentrators are not included in the design of the Rehost, only switching equipment.

Mechanism: National Airspace Data Interchange Network Packet-Switched Network (NADIN PSN) [21]

The National Airspace Data Interchange Network Packet-Switched Network (NADIN PSN) (sometimes called NADIN II) is an X.25 packet-switched network that augments and functions in parallel with the NADIN Message-Switched Network (NADIN MSN). Collectively, both networks are known as NADIN. The NADIN PSN is a data communications network composed of packet-switching nodes connected by high-speed digital backbone trunks and controlled by the National Network Control Center (NNCC).

The NADIN PSN has no official planned changes at this time. There is an understanding that users will gradually transition from NADIN X.25 and frame relay to Internet Protocol (IP), by attrition, over the next few years. Those users could take advantage of several alternative options, as available and if appropriate for the end use.

Mechanism: Next Generation Messaging (NEXGEN Messaging) [2199]

The Next Generation Messaging (NEXGEN Messaging) program is the FAA’s enterprise-wide messaging system with a 10-year life cycle. NEXGEN currently serves approximately 43,000 messaging users with twelve message stores located at the nine regional offices, the two centers, and at headquarters. NEXGEN provides support through a three-tier system, which includes 1,200 local support personnel, 12 Regional Messaging Administration Teams, and 24 hours per day, 7 days a week (24/7) National Help Desk.

Mechanism: Radio Communication Link (RCL) [22]

The Radio Communication Link (RCL) is an integrated voice and data microwave transmission system designed to provide the FAA with cost effective and reliable service for its high capacity National Airspace System (NAS) communications routes. The RCL interconnects Air Route Traffic Control Center (ARTCC) facilities with long-range radar installations and other air traffic control (ATC) facilities.

Mechanism: Radio Control Equipment (RCE) [31]

Radio Control Equipment (RCE), located at both air traffic control (ATC) facilities and remote communication sites, control the operation of remotely located ground to air very high frequency/ultra high frequency (VHF/UHF) radios used by air traffic controllers to communicate with pilots. The RCE interfaces with the voice switch at the ATC facility, telephone landlines, and ground-to-air radios at the En Route Remote Communications Air/Ground (RCAG) sites, Terminal Remote Transmitter/Receiver (RTR) sites, and Flight Service Station Remote Communications Outlet (RCO) sites.

Mechanism: System Wide Information Management (SWIM) [7367]

Note the FAA Joint Resources Council (JRC) approved the System Wide Information Management (SWIM) Segment 1 initial investment decision (JRC 2a) on 17 July 2006.

The System Wide Information Management (SWIM) Program will provide a secure NAS-wide information web to connect FAA systems to each other, and enable interaction with other members of the decision-making community including other agencies, air navigation service providers, and airspace users. SWIM will provide policies and standards to support data management, along with the core services needed to publish data to the network, retrieve it, secure its integrity, and control its access and use. SWIM will leverage existing systems and networks to the extent practicable, and be based on technologies that have been proven in both operational and demonstration environments to reduce cost and risk. SWIM will be developed incrementally based upon the needs of various data communities, maturity of concepts of use, and segments that are right-sized to fit reasonable cost, schedule, and risk thresholds.

SWIM supports a transition to network-enabled operations (NEO), providing the same high quality, timely data to many users and applications - extending beyond the previous focus on unique, point-to-point interfaces for application-to-application data exchange. SWIM leverages technology to reduce redundancy of information (multiple instances of information adds cost and supposedly the same but slightly different information adds risk); facilitates horizontal (cross-federal) information-sharing; establishes a direct relationship between information technology and the mission performance of FAA; and maximizes information technology development to better achieve mission outcome. SWIM is a program for collaboration and consolidation through information technology. To the extent possible, SWIM will be built into existing NAS systems instead of being acquired as a new, standalone capability.

When fully implemented, SWIM will contribute to meeting these NGATS objectives related to expanded system capacity, improved predictability, and reduced cost of service. The SWIM program evolved out of the Global Communications, Navigation, and Surveillance System technology development activities conducted between 2004 and 2006.

Mechanism: Weather Message Switching Center Replacement (WMSCR) [272]

The Weather Message Switching Center Replacement (WMSCR) is the primary National Airspace System (NAS) interface with the National Weather Service (NWS) Telecommunications Gateway (NWSTG) for the exchange of aviation alphanumeric and limited gridded weather products. WMSCR collects, processes, stores, and disseminates aviation weather products to major NAS systems, the airlines, and international and commercial users. WMSCR also provides storage and distribution of domestic Notice To Airmen (NOTAM) data and retrieval of international NOTAMs through the Consolidated NOTAM System (CNS).

Mechanism: Weather Message Switching Center Replacement (WMSCR) Sustain (WMSCR Sustain) [1676]

The Weather Message Switching Center Replacement (WMSCR) sustainment activity will sustain the existing WMSCR functionality of distributing alphanumeric weather text and NOTAM products through a hardware and software upgrade program. This upgrade program will consist of Commercial-off-the-Shelf processors, physical disk drives, workstations, network routers, printer, operating system, High Order Language programming software, and other commercially available software packages.

Domain: Air Traffic Control Navigation

Lighting

Mechanism: Approach Light System with Sequenced Flashers Next Generation (ALSF NexGen) [6456]

Approach Lighting System with Sequenced Flashers Next Generation (ALSF NexGen) is a 2400-foot long array of high intensity Light Emitting Diode (LED) lamps and flashers located on the final approach to a runway and are provided to support Category II and III instrument approaches. The ALSF NexGen systems assists pilots transition from low visibility Instrument Meteorological Conditions (IMC) to visual conditions for landing. A row of green lights marks the runway threshold.

These systems are installed at new locations so they will not replace the existing ALSF-2 Tech Refresh systems.

Mechanism: Approach Lighting System with Sequenced Flashers Model 2 (ALSF-2) [214]

Approach Lighting System with Sequenced Flashers, Model 2 (ALSF-2) is a 2400 foot long array of high intensity incandescent lamps and flashers located on the final approach to a runway and are provided to support Catetory II and III instrument approaches. The ALSF-2 assists pilots transition from low visibility Instrument Meteorological Conditions (IMC) to visual conditions for landing. A row of green lights marks the runway threshold.

These ALSF-2 systems represent the current acquisition of NBP type systems.

Mechanism: Approach Lighting System with Sequenced Flashers Model 2 First Generation (ALSF-2 First Gen) [6418]

Approach Lighting System with Sequenced Flashers, Model 2 (ALSF-2) First Generation is the older Godfrey, Airflo, and other systems first deployed in the 1970s. It is a 2400 foot long array of high intensity incandescent lamps and flashers located on the final approach to a runway and are provided to support Catetory II and III instrument approaches. The ALSF-2 assists pilots transition from low visibility Instrument Meteorological Conditions (IMC) to visual conditions for landing. A row of green lights marks the runway threshold.

Mechanism: Approach Lighting System with Sequenced Flashers Model 2 Technological Refresh (ALSF-2 Tech Refresh) [216]

The Approach Lighting System with Sequenced Flashers Model 2 (ALSF-2) is a dual-mode system with 219 lamps that can be re-configured as a 50-light Simplified Short Approach Lighting system with Runway alignment lights (SSALR) to meet reduced approach lighting requirements. The ALSF-2 will support Category II and Category III precision landings and the SSALR will support Category I precision landings. The ALSF-2 tech refresh will utilize technology available in the procurement timeframe.

Mechanism: Approach Lighting System with Sequenced Flashing Lights Model 1 (ALSF-1) [2212]

The Approach Lighting System with Sequenced Flashing Lights Model 1 (ALSF-1) is a system of high-intensity lights marking the extended runway centerline for 2,400 to 3,000 feet from the runway threshold. A row of green indicators mark the runway threshold.

ALSF-1 are very old systems and, when funded, will be replaced with current technology MALSR or ALSF-2 systems depending on whether the runway will support Cat I instrument approaches (MALSR) or Cat II/III instrument approaches (ALSF-2).

Mechanism: Lead-in-light System (LDIN) [2306]

A Lead-in-light System (LDIN) consists of one or more series of flashing lights installed at or near ground level that provides positive visual guidance along an approach path, either curving or straight, where special problems exist with hazardous terrain, obstructions, or noise abatement procedures.

Mechanism: Medium-Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR) [184]

The Medium-Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR) supports Category I instrument approaches. It is a medium intensity light system that identifies the extended runway centerline from threshold to 2,400 feet before the threshold. The MALSR supports Category I instrument approaches and presents to the pilot the illusion of a ball of light traveling from the outer end of the system to a point approximately 1,400 feet from the end of the runway. A row of green lights marks the threshold of the runway.

MALSF and MALS are subsets of MALSR. A MALSR has 45 lights, 5 flashers, and is 2400 ft in length. A MALSF has 45 lights, 3 flashers, and is 1400 ft in length. MALS has 45 lights, no flashers, and is 1400 ft in length.

Mechanism: Medium-Intensity Approach Light System with Runway Alignment Indicator Lights Next Generation (MALSR NEXGEN) [2223]

The Medium-Intensity Approach Light System with Runway Alignment Indicator Lights (RAIL) Next Generation (MALSR NEXGEN) is an array of medium-intensity lights marking the extended runway centerline for approaching aircraft. The RAIL begins 2400 feet from threshold and extends 1000 feet. The MALSR supports Category I instrument approaches and presents the illusion of a ball of light leading towards the runway. The MALS portion of the MALSR begins 1400 feet from threshold and ends 200 feet from threshold. A row of green lights marks the threshold of the runway.

Mechanism: Medium-Intensity Light System with Runway Alignment Indicator Lights Technology Refresh (MALSR Tech Refresh) [2134]

The Medium-Intensity Light System with Runway Alignment Indicator Lights Technology Refresh (MALSR Tech Refresh) is an array of high intensity Light Emitting Diode (LED) lights marking the extended runway centerline for 2,400 to 3,000 feet from the runway threshold. The MALSR supports Category I instrument approaches and presents to the pilot the illusion of a ball of light traveling from the outer end of the system to a point about 1,400 feet from the end of the runway. An indicator marks a point 1,000 feet from the end of the runway. A row of green lights indicates the threshold of the runway.

Mechanism: Omnidirectional Approach Lighting System (ODALS) [185]

The Omnidirectional Approach Lighting System (ODALS) is a system of sequenced flashing lights marking the extended runway centerline for 1,500-feet. Indicators placed at the end of the runway mark each edge of the runway.

Mechanism: Precision Approach Path Indicator (PAPI) [187]

The Precision Approach Path Indicator (PAPI) is a simple visual aid to assist pilots during their approach to landing in Visual Flight Rules (VFR) conditions. It enables pilots to acquire the correct glide slope and subsequently to maintain their position on it, thus ensuring an accurate approach and landing. The PAPI system consists of four sharp transition projector units located at the side of the runway spaced laterally +/- 30 foot intervals. A second complementary set is sometimes provided on the opposite side of the runway. The setting angles of the red/white interfaces of the four units are graded; the differences in angle between the units being typically 20 minutes of arc. The nominal glide slope is midway between the angular settings of the center pair of units and the on-glide-slope signal and is thus two red and two white lights in the bar. If the aircraft goes below the glide slope, the pilot will see a progressively increasing number of red lights. Conversely, if the aircraft goes above the glide slope, the number of white lights seen is increased.

Mechanism: Precision Approach Path Indicator Next Generation (PAPI NEXGEN) [6338]

The Precision Approach Path Indicator Next Generation (PAPI NEXGEN) provides precision visual glide slope guidance to assist pilots in landing. The PAPI consists of four sharp transition projector units located on one side of the runway, spaced laterally at 29.5-foot intervals.

Mechanism: Runway Alignment Indicator Lights (RAIL) [2307]

Runway Alignment Indicator Lights (RAIL) are a series of sequenced flashing lights that are installed only in combination with other lighting systems.

Mechanism: Runway Centerline Lighting (RWCLL) [2305]

Runway Centerline Lighting (RWCLL) consists of flush centerline lights spaced at 50-foot intervals beginning 75 feet from the landing threshold and extending to within 75 feet of the opposite end of the runway.

Mechanism: Runway End Identifier Lighting (Next Generation) (REIL (Nexgen)) [2462]

Runway End Identifier Lights (REIL) (Next Generation) is the next generation of an airport lighting facility in the terminal area navigation system, consisting of one flashing white high intensity light installed at each approach end corner of a runway and directed towards the approach zone, which enables the pilot to identify the approach end of the runway.

Mechanism: Runway End Identifier Lights (REIL) [188]

Runway End Identifier Lights (REIL) is an airport lighting system consisting of two flashing, white, high intensity lights located at each approach end corner of a runway. The REILs are directed towards the approach zone to enable pilots to identify the end of the runway.

Mechanism: Runway Lights (RL) [2304]

Runway Lights (RL) are lights having a prescribed angle of emission used to define the lateral limits of a runway. Runway lights are uniformly spaced at intervals of approximately 200-feet, and the intensity may be controlled or preset.

Runway lights are procured, installed, and maintained by the airport. The FAA is not involved with these light systems other than publishing the necssary lighting standards which the airport uses for guidance.

Mechanism: Short Approach Lighting System (SALS) [2213]

A Short Approach Lighting System (SALS) is an array of high-intensity lights marking the extended runway centerline for 2,400 to 3,000 feet from the runway threshold. The system presents to the pilot the illusion of a ball of light traveling from the outer end of the system to a point 1,000 feet from the end of the runway. Two additional rows of lights indicate the edges of the runway for the last 1,000 feet with special indicators placed 1,000 feet, 500 feet and at the runway threshold.

Mechanism: Short Approach Lighting System with Sequenced Flashing Lights (SALSF) [2214]

Short Approach Lighting System with Sequenced Flashing Lights (SALSF) is an array of high intensity lights marking the extended runway centerline for 1,500 feet. The system presents to the pilot the illusion of a ball of light traveling from the outer end of the system to a point 1,000 feet from the end of the runway. Indicators placed at the end of the runway mark the center and each edge of the runway. An additional indicator marks a point 1,000 feet from the end of the runway.

Mechanism: Simplified Short Approach Light System with Runway Alignment Indicator Lights (SSALR) [190]

The Simplified Short Approach Light System with Runway Alignment Indicator Lights (SSALR) is a SSALS facility with sequence flashers installed from 1,600 to 2,400 feet from the runway threshold. Normal spacing between lights is 200 feet. This system assists pilots in transitioning from precision approach Instrument Flight Rules (IFR) to Visual Flight Rules (VFR) for landing.

Mechanism: Simplified Short Approach Lighting System (SSALS) [2215]

The Simplified Short Approach Lighting System (SSALS) is an array of medium-intensity lights marking the extended runway centerline for 1,400 feet. A special indicator marks a point 1,000 feet from the end of the runway. A row of green lights indicates the threshold runway.

Mechanism: Simplified Short Approach Lighting System with Sequenced Flashing Lights (SSALF) [2216]

The Simplified Short Approach Lighting System with Sequenced Flashing Lights (SSALF) is a system of medium-intensity lights marking the extended runway centerline for 1,400 feet. The system presents to the pilot the illusion of a ball of light traveling from the outer end of the system (1,400 feet) to a point 1,000 feet from the end of the runway. A special indicator marks a point 1,000 feet from the end of the runway. A row of green lights indicates the threshold runway.

Mechanism: Touchdown Zone Lighting (TDZL) [2308]

A Touchdown Zone Lighting (TDZL) consists of two rows of transverse light bars located symmetrically about the runway centerline normally at 100-foot intervals. The basic system extends 3,000 feet along the runway.

Mechanism: Visual Approach Slope Indicator (VASI) [192]

A Visual Approach Slope Indicator (VASI) system is a light system that is accurately located alongside a runway to provide a visual glide slope to landing aircraft. VASIs radiate a directional pattern of high intensity, red and white focused light beams to form the glide path and are utilized primarily under Visual Flight Rules (VFR) conditions.

Signage/Markings Navigation

Mechanism: AIR-21 Cost Sharing Pilot Program (AIR-21) [7096]

Projects which will be eligible for the new cost-sharing program are those that promote the safety, efficiency or mobility of the nation’s air traffic control (ATC) system; these projects must fall into one of three categories: 1. Airport-specific air traffic facilities and equipment (F&E), including Local Area Augmentation System (LAAS), Instrument Landing System (ILS), weather and wind shear detection equipment, lighting improvements, and airport control towers. 2. Automation tools to effect improvements in airport capacity, including passive final approach spacing tools (pFAST), and traffic management adviser (TMA) equipment. 3. Facilities and equipment that enhance airspace control procedures, including consolidation of terminal radar control facilities an equipment, or assist in en route surveillance, including oceanic and offshore flight tracking.

Signal-in-Space Navigation

Mechanism: Augmentation for the Global Positioning System Wide Area Augmentation System (Augment GPS WAAS – Surveys and Proc) [7356]

This Augmentation for the Navstar Global Positioning System (GPS) Wide Area Augmentation System (WAAS) - Surveys and Procedures project provides for conducting surveys and developing procedures using GPS-WAAS.

Mechanism: Direction Finder (DF) [196]

Direction Finder (DF) is a VHF/UHF radio receiver equipped with a antenna capable of detecting the direction to an aircraft radiating a Radio Frequency (RF) tone. DFs are used to establish a "direction fix" for pilots requesting orientation assistance.

Mechanism: Direction Finder (DF) [7241]

A Direction Finder (DF) is a very high frequency/ultra high frequency (VHF/UHF) radio receiver equipped with an antenna capable of detecting the direction to an aircraft radiating a radio frequency (RF) tone. Direction finders are used to establish a "direction fix" for pilots requesting orientation assistance.

Additional information can be found in “2001 Federal Radionavigation Systems,” U.S. Departments of Defense and Transportation, Washington, DC, [http://www.navcen.uscg.gov/pubs/default.htm]

Mechanism: Distance Measuring Equipment (DME) [653]

Distance Measuring Equipment (DME) is a UHF (Ultra High Frequency) ground-based navigation aid that responds to aircraft DME avionics interrogations, thereby enabling the avionics to determine the slant range between the aircraft and the ground station. DMEs are typically collocated with a VOR to form a VOR/DME facility for enroute navigation, or with an Instrument Landing System Localizer for precision landing procedures. Slant range data can also be obtained from the DME function of a Tactical Air Navigation (TACAN) system. A navigation facility containing a TACAN and a VOR is termed a VORTAC).

DMEs will be sustained to support en route navigation and precision landings. In the future DME quantities may be expanded to provide a redundant ground-based area navigation (RNAV) capability to supplement GPS procedures.

Separate funding segments and acquisition projects have been established for High power (en route) DMEs, and low power (terminal) DMEs. This mechanism addresses the high power DMEs.

Mechanism: Distance Measuring Equipment Replacement (DME Replacement) [6373]

Distance Measuring Equipment (DME) is a UHF (Ultra High Frequency) ground-based radio navigation aid. DME avionics transmit interrogation pulses, and the ground-based responder sends a reply. The avionics process the reply and determine the slant range between the aircraft and the ground station. Separate funding segments and acquisition projects have been established for two generic classes of DME ground stations: High power (en route) DMEs, and low power (terminal) DMEs. This mechanism addresses only the the high power DMEs.

DMEs may be provided alone, but are more often collocated with a VOR to form a VOR/DME facility, allowing aircraft to determine both the bearing and slant range to the ground station - and hence a navigational position fix. DMEs are approved as a primary navigation system in the NAS. The DME function is frequently provided by the TACAN system that also provides azimuth guidance to military users. (DME and the distance-measuring portion of TACAN are functionally the same.) When combined with a VOR, these facilities are called VORTACs. The DME network will be sustained to support en route navigation and to serve as an independent backup navigation source to GPS and GPS/WAAS. The DME network may also need to be expanded to provide a redundant area navigation (RNAV) capability for terminal area operations at major airports.

This mechanism replaces aging high power DME facilities through either a service life extension program (SLEP) or outright replacement.

Mechanism: Galileo (Galileo) [6769]

On 28 December 2005 the European Space Agency (ESA) launched their first test satellite for the Galileo project, which will comprise a constellation of 30 navigation satellites. Galileo is expected to be complete the 30-satellite constellation by 2010, with some services starting as soon as 2008. Its global positioning capabilities may be more accurate than the current Navstar Global Positioning System (GPS) system, which is controlled by the U.S. military, and may even work indoors. Its signals should be compatible with current GPS hardware.

Galileo will offer several worldwide service levels, including open access and restricted access for various segments of users. These services include: (1) A basic Open Service (OS), supplied free of charge to the general public; (2) A for-fee Commercial Service (CS) for professional, high-precision applications; (3) A Safety of Life Service (SoL) providing enhanced accuracy and integrity for safety-critical applications such as aircraft approach and landing a Search and Rescue (SAR) service, (4) An encrypted Public Regulated Service (PRS), for military and para-military users. These services are mostly compatible with existing GPS services.

Additional information http://www.esa.int/esaNA/galileo.html

Mechanism: Global Positioning System (GPS) [180]
The Global Positioning System (GPS) is a (nominal) 24 satellite constellation orbiting at approximately 12,000 miles above the earth in six equally-spaced planes. GPS satellites broadcast a precisely timed L-band signal that is received and processed onboard aircraft, in ground vehicles or hand-held receivers to determine the users three-dimensional position (i.e., latitude, longitude and altitude), velocity (if applicable) and the precise time of day. The GPS was developed, and is maintained & operated by, the U.S Department of Defense. GPS equipped aircraft can navigate on published jetways or utilize Area Navigation (RNAV) to fly a desired route between two locations.

Approval has been granted for properly certified GPS avionics to be used as a primary means of navigation in oceanic airspace and in certain remote areas. In July 2003 the Wide Area Augmentation System (WAAS)was commissioned, thereby ensuring GPS/WAAS enabled primary navigation service throughout the NAS. WAAS ensures that GPS sourced data meets requirements for accuracy, availability, and integrity.

Mechanism: Global Positioning System III (GPS III) [6797]
The Navstar Global Positioning System (GPS) is a space-based radio positioning, navigation, and time (PNT) distribution system. The GPS Block III Space and Control Segments include, but are not limited to, advanced concept development, systems engineering and analysis, satellite systems development, the study of augmentation systems, control segment development, user equipment interfaces, training simulators, Integrated Logistics Support (ILS) products, and developmental test resources.

GPS Block III, will give new navigation warfare (NAVWAR) capabilities to shut off GPS service to a limited geographical location while providing GPS to United States (U.S.) and allied forces.

The generation after next will be composed of GPS Block III satellites, which will include all of the legacy capabilities, plus the addition of high-powered, anti-jam military-code, along with other accuracy, reliability, and data integrity improvements. Plans are being formulated to conduct an architecture study for the next-generation satellite navigation system, GPS Block III, capable of meeting military and civil needs through 2030. This jam resistant, modernized version of the world’s greatest free utility will be developed and delivered to ensure the U.S. has the most precise and secure positioning, navigation and timing capability.

The GPS Block III program objective is to develop and deploy an improved systems architecture for the NAVSTAR Global Positioning System (GPS) to assure reliable and secure delivery of enhanced position, velocity, and timing (PVT) signals for the evolving needs of GPS civil and military users. GPS Block III should eliminate numerous existing shortcomings and vulnerabilities inherent in the current GPS architecture that threaten to severely impact vital civil commerce, transportation, public safety, as well as military operations in the future.

As of August 2006 the GPS Block III contract award is now scheduled for Fiscal Year (FY) 2007. The initial launch of the first GPS Block III satellite is still planned for FY 2013.

Additional Information: http://www.globalsecurity.org/space/systems/gps_3.htm

Mechanism: Global Positioning System L5 (GPS L5) [6783]
For several years now, the Global Positioning System (GPS) has been recognized as the future of navigation for most military and civil applications, including those for various modes of transportation. The civil aviation community has been one of the main benefactors of GPS due to its flexibility and worldwide applicability. In 1999, as a direct result of these benefits to the civil community, Vice President Al Gore announced that the U.S. would embark on a GPS modernization effort to extend the capabilities of GPS even further than those of the existing GPS constellation.

One of the main components of this modernization is the addition of two new navigation signals for civil use. These signals will be in addition to the existing civilian service broadcast at 1575.42 MHz (L1). The first of these new signals will be a new civil code, called L2C, which will be added on the existing L2 carrier, located at 1227.60 MHz. It will be available for general use in non-safety critical applications. The Block IIR-M satellite, the first to add his capability was launched September 25, 2005.

A third civil signal, located at 1176.45 MHz (L5), will be provided initially on GPS Block IIF satellites beginning in 2007, and continuing with the Block III satellites scheduled for launch beginning in 2012. This new L5 signal is protected worldwide for aeronautical radionavigation use, and will support aviation safety-of-life applications. The addition of L5 will make GPS a more robust radionavigation service for many aviation applications, as well as all ground-based users (maritime, railways, surface, shipping, agriculture, recreation, etc.)

At the current GPS satellite replenishment rate, all three civil signals (L1-C/A, L2C, and L5) will be available for initial operational capability by 2012, and for full operational capability by approximately 2015.

L5 will provide significant benefits above and beyond the capabilities of the current GPS constellation, even after the planned second civil frequency (L2) becomes available. Benefits include precision approach navigation worldwide, increased availability of precision navigation operations in certain areas of the world, and improved interference mitigation.

Additional Information: http://gps.faa.gov/gpsbasics/GPSmodernization-text.htm

Mechanism: Ground Uplink Station (GUS) [7054]
The FAA Wide Area Augmentation System (WAAS) uses a network of precisely located ground reference stations, called Wide Area Reference Stations (WRS), which monitor Navstar Global Positioning System (GPS) satellite signals. These stations are located throughout the continental U.S., Hawaii, Puerto Rico, Alaska, Canada, Mexico, and several other international locations. The stations collect and process GPS information and send the information to two WAAS Master Stations (WMS).

The WMSs develop a WAAS correction message that is sent via Ground Uplink Stations (GUS) to user receivers via navigation transponders on geostationary satellites (GEO). Ground uplink stations (GUSs) were installed to transmit the WAAS signal to the new GEOs. The GUS pair for the PanAmSat Galaxy 15 satellite are located in Napa, California and Littleton, Colorado. The GUS pair for the Telesat Anik F1R satellite are located at Brewster, Washington and Woodbine, Maryland.

The WAAS message improves the accuracy, availability, and safety of GPS-derived position information. Using WAAS, GPS signal accuracy is improved from 20 meters to approximately 1.5 – 2 meters in both the horizontal and vertical dimensions.

Additional information at http://gps.faa.gov

Mechanism: Instrument Landing System Category I (ILS CAT I) [199]
Category (CAT) I Instrument Landing Systems (ILS) support precision landing operations for visibility conditions equal to or greater than a 200 feet decision height above the runway threshold and a touchdown zone runway visual range of at least 1,800 feet.

All ILS radiate runway approach guidance, i.e., alignment and descent information, to aircraft on final approach to a runway. An ILS consists of a highly directional localizer located at the far end of the runway, a glide slope located near, and offset from, the approach end of the runway. Marker beacons located along the runway''s approach course provide visual and aural indications in the cockpit that indicate the aircraft''s distance from the runway threshold. Marker beacons can be supplanted or replaced by Distance Measuring Equipment (DME) that is typically co-located with the localizer station. The presence and utilization of a DME to aid in making a precision approach is included in the approach procedure for the runway.

ILS feature integral monitoring of the radiated signals to ensure that the radiated guidance is within specified operating tolerances to ensure the signal-in-space approach guidance is safe. They also possess remote maintenance monitoring (RMM) to support remote access and monitoring of the operating status of each ILS station.

Mechanism: Instrument Landing System Category I Replacement (ILS CAT I Rpl) [6347]
Provides lateral (azimuth) and vertical (glide slope) guidance to aircraft during precision approach. Supports Category I (CAT I) aircraft landing operations.

CAT I service may eventually be provided by WAAS and/or LAAS at many airports. Until then, service will continue to be provided by ILS technology. This program replaces aging

ILS systems through either SLEP or outright replacement.

Mechanism: Instrument Landing System Category II/III (ILS CAT II/III) [200]

Category (CAT) II Instrument Landing Systems (ILS) support precision landing operations for 100 foot decision heights and a touchdown zone runway visual range (RVR) of at least 1200 feet. CAT III ILS support precision approaches with decision heights of 50 or less feet and touchdown zone RVR less than 700 feet.

All ILS radiate runway approach guidance, i.e., alignment and descent information, to aircraft on final approach to a runway. Equipment-wise an ILS consists of a highly directional localizer located at the far end of the runway, a glide slope located near, and offset from, the approach end of the runway, and marker beacons located along the approach course that provide visual and aural information on how far the aircraft is from the runway threshold. ILS marker beacons can be supplanted or replaced by Distance Measuring Equipment (DME) that is typically co-located with the localizer station. The presence and utilization of a DME to aid in making a precision approach is included in the approach procedure for the runway.

ILS feature integral monitoring of the radiated signals to ensure that the radiated guidance is within specified operating tolerances to ensure the signal-in-space approach guidance is safe. They also possess remote maintenance monitoring (RMM) to support remote access and monitoring of the operating status of each ILS station.

The Local Area Augmentation System (LAAS) may eventually support CAT II/III service. In the interim precision landing services will continue to be provided using ILS technology, which requires that the older population of the current ILS inventory must be either replaced or upgraded (modernized) via a service life extension program.

Mechanism: Instrument Landing System Category II/III Replacement (ILS CAT II/III Rpl) [6348]

Provides lateral (azimuth) and vertical (glide slope) guidance to aircraft during precision approach. Supports Category II/III (CAT II/III) aircraft landing operations.

CAT II/III service may eventually be provided by LAAS. Until then, service will continue to be provided by ILS technology. This program replaces aging ILS systems through either SLEP or outright replacement.

Mechanism: Local Area Augmentation System Category I (LAAS CAT I) [181]

The Local Area Augmentation System Category I (LAAS CAT I) is a safety-critical precision navigation and landing system that augments Global Positioning System (GPS) range data to provide aircraft position accuracy necessary for CAT I precision approaches; i.e., 200 foot decision height and one-half mile visibility. LAAS will provide service to suitably equipped users for runways equipped with required peripheral systems; e.g., approach zone Runway Visual Range (RVR) and Approach Lighting System (ALS). The LAAS signal-in-space will provide: (1) local area differential corrections for GPS satellites and Wide Area Augmentation System (WAAS) Geostationary Earth Orbit (GEO) satellites; (2) the associated integrity parameters; and (3) the path points that describe the final approach segment.

The LAAS CAT I will utilize multiple GPS reference receivers and their associated antennas, all located within the airport boundary, to receive and process the GPS and WAAS GEO range measurements and navigation data. The LAAS information is broadcast to aircraft operating in the local terminal area (nominally 20 nautical miles) via a very high frequency (VHF) data broadcast (VDB) transmission.

In FY-04 LAAS reverted from development to research & development (R&D) for resolution of some integrity issues. The schedule shown below is notional & will need to be definitized once the strategy is determined for achieving GLS (GNSS Landing System) performance (i.e., equivalent to Category I Instrument Landing System) with satellite-based navigation.

As of April 2006 the FAA, Honeywell and the LIP (LAAS Integrity Panel) are making progress on LAAS integrity issues. By the fall of 2006 the FAA and FedEx aircraft plan to fly tests to validate the technical and operational performance of the LAAS prototype installed in Memphis, Tennessee. Following those tests, the processing architecture will be upgraded and a complete set of prototype software functions to host all International Civil Aviation Organization (ICAO) SARPs (Standards And Recommended Practices) Category-I functions will be integrated at Memphis and also at a second new LAAS facility at the FAA"s William J. Hughes Technical Center in Atlantic City, New Jersey. This is scheduled to be accomplished by December 2007.

Meanwhile, the FAA is also coordinating with other service providers interested to fund development, test, and regulatory approval activities. In February 2006, the FAA and Airservices Australia signed a memorandum of cooperation as a first step toward establishing an international cooperative development effort to obtain approval for Honeywell"s Category-I LAAS.

[Source: SatNav News, April 2006, http://gps.faa.gov/Library/]

Mechanism: Local Area Augmentation System Category I Technological Refresh (LAAS CAT I Tech Refresh) [2063]

LAAS CAT I Tech Refresh periodically (5-7 years) replaces Line Replaceable Units (LRUs) that lifecycle engineering analyses determine will become unsupportable. Tech Refresh will not increase the LAAS"" functionality.

Mechanism: Local Area Augmentation System Category II/III (LAAS CAT II/III) [500]

The CAT II/III Local Area Augmentation System (LAAS) will provide guidance that meets the accuracy, integrity and availabililty requirements for CAT II and III precision approaches. The Wide Area Augmentation System (WAAS) and LAAS together will provide a seamless satellite-based navigation capability for all phases of flight.

CAT II/III LAAS is an ongoing R&D effort which, if successful, is envisioned to lead to a follow-on development and procurement program. CAT II/III LAAS installations might ultimately complement or replace the CAT II/III Instrument Landing Systems (ILS) that are currently in the NAS.

LAAS consists of a precisely surveyed ground station with multiple Global Positioning System (GPS) receivers, a very high frequency (VHF) radio data broadcast (VDB), and possibly one or more pseudolites to increase availability. The LAAS ground station will receive, process, and communicate differential correction information, together with an integrity message, to aircraft avionics within a nominal radius of 20 to 30 nautical miles from the airport.

Pseudolites are ground-based transmitters that broadcast GPS-like signals. Although not currently envisioned as part of the LAAS architecture, pseudolites may be required to ensure that LAAS meets CAT II/III requirements. Peudolites can be used as a data link to transmit differential corrections and integrity status to aircraft avionics and as a supplementary ranging source. When used as ranging sources, pseudolites can improve system accuracy by improving the local constellation geometry and system availability.

Schedule shown below is notional & will need to be definitized once the strategy is determined for achieving GLS (GNSS Landing System) performance (i.e., equivalent to Category II/III Instrument Landing System) with satellite-based navigation.

Mechanism: Local Area Augmentation System Category II/III Technological Refresh (LAAS CAT II/III Tech Refresh) [2130]

LAAS CAT II/III Tech Refresh periodically (5-7 years) replaces Line Replaceable Units (LRUs) that lifecycle engineering analyses determine will become unsupportable. Tech Refresh will not increase the LAAS"" functionality.

Mechanism: Localizer (LOC) [2183]

The component of an ILS that provides lateral course guidance to the runway. Localizer will provide non-precision approach capability with appropriate lead-in lights.

Mechanism: Localizer Type Directional Aid (LDA) [2326]

The Localizer-type Directional Aid (LDA) is of comparable use and accuracy to a localizer but is not part of a complete ILS. The LDA course usually provides a more precise approach course than the similar Simplified Directional Facility (SDF) installation, which may have a course width of 6 or 12 degrees.

The LDA is not aligned with the runway. Straight-in minimums may be published where alignment does not exceed 30 degrees between the course and runway. Circling minimums only are published where this alignment exceeds 30 degrees.

Mechanism: Loran-C (Loran-C) [182]

Loran-C is a low frequency (LF), long-range, ground-based radionavigation aid operated by the U.S. Coast Guard. Loran-C transmitting stations broadcast a series of precisely timed pulses. Loran-C avionics measure the time difference between pulses received from three or more ground stations and determine the two-dimensional position (i.e., latitude and longitude) and velocity of the aircraft. Loran-C avionics provide an Area Navigation (RNAV) capability that permits operation on any desired course within the coverage area of the stations being used.

Loran-C is currently approved as a supplemental system in the National Airspace System (NAS), meaning that it must be used in conjunction with a primary system. Current Loran-C avionics support en route navigation but do not support instrument approach operations.

Operation of Loran-C beyond 2008 will be based upon a determination by the Department of Transportation and the Department of Homeland Security whether the system is needed as a backup to GPS for transportation and timing applications.

Mechanism: Low Power Distance Measuring Equipment (LPDME) [2225]

Distance Measuring Equipment (DME) is an Ultra High Frequency (UHF) ground-based radio-navigation aid. DME ground stations reply to interrogations transmitted by aircraft avionics, and are capable of processing replies from more than 100 aircraft at a time. The DME avionics measure the time between an interrogation and a reply to determine the slant range to the ground station.

Acquisition projects have been established for two generic classes of DME ground stations: high power and low power. High power DMEs (HPDMEs)are rated at 1kw and are located to support enroute navigation. HPDMEs are typically co-located with VHF OmniRange systems, forming what is termed a VOR/DME facility. Low power DMEs (LPDMEs) are rated at 100w and are located to support terminal area navigation such as ILS approaches.

LPDMEs are installed with many ILS facilities. When specified in the ILS approach procedure, DME may be used in lieu of the outer marker, as a back-course final approach fix, or to establish other fixes on the localizer course. LPDMEs are also installed with some localizer-only (LOC) facilities. Additional LPDMEs are being installed to support ILS approaches as recommended by the Commercial Aviation Safety Team (CAST).

Mechanism: Microwave Landing System (MLS) [197]

. The MLS provides precision navigation guidance for exact alignment and descent of aircraft on approach to a runway. It provides azimuth, elevation, and distance.2. Both lateral and vertical guidance may be displayed on conventional course deviation indicators or incorporated into multipurpose cockpit displays. Range information can be displayed by conventional DME indicators and also incorporated into multipurpose displays.3. The MLS supplements the ILS as the standard landing system in the United States for civil, military, and international civil aviation. At international airports, ILS service is protected to 2010. 4. The system may be divided into five functions: (a) Approach azimuth, (b) Back azimuth, (c) Approach elevation, (d) Range, and (e) Data communications. 5. The standard configuration of MLS ground equipment includes: (a) An azimuth station to perform functions (a) and (e) above. In addition to providing azimuth navigation guidance, the station transmits basic data, which consists of information associated directly with the operation of the landing system, as well as advisory data on the performance of the ground equipment. (b) An elevation station to perform function (c). (c) Distance Measuring Equipment (DME) to perform range guidance, both standard DME (DME/N) and precision DME (DME/P). 6. MLS Expansion Capabilities: The standard configuration can be expanded by adding one or more of the following functions or characteristics. (a) Back azimuth: Provides lateral guidance for missed approach and departure navigation. (b) Auxiliary data transmissions: Provides additional data, including refined airborne positioning, meteorological information, runway status, and other supplementary information. (c) Expanded Service Volume (ESV) proportional guidance to 60 degrees. 7. MLS identification is a four-letter designation starting with the letter M. It is transmitted in International Morse Code at least six times per minute by the approach azimuth (and back azimuth) ground equipment. b. Approach Azimuth Guidance1. The azimuth station transmits MLS angle and data on one of 200 channels within the frequency range of 5031 to 5091 MHz. 2. The equipment is normally located about 1,000 feet beyond the stop end of the runway, but there is considerable flexibility in selecting sites. For example, for heliport operations the azimuth transmitter can be collocated with the elevation transmitter. 3. The azimuth coverage extends: (a) Laterally, at least 40 degrees on either side of the runway centerline in a standard configuration, (b) In elevation, up to an angle of 15 degrees and to at least 20,000 feet, and(c) In range, to at least 20 NM.

Mechanism: Non-Directional Beacon (NDB) [194]

Non-Directional Beacons (NDB) are low frequency (LF) or medium frequency (MF) ground-based radio navigation aids that broadcast a continuous wave (CW) signal with a Morse code identification on an assigned frequency signal. NDBs are used by pilots to determine the aircraft""s bearing to the ground station. Some state-owned and locally owned NDBs are also used to provide weather information to pilots.

NDBs can be used for non-precision approaches at low traffic airports, as compass locators (locator outer markers (LOMs)) to aid a pilot in finding the initial approach point of an Instrument Landing System (ILS), and for en route operations in remote areas. NDBs are approved as a primary navigation system in the National Airspace System (NAS).

Mechanism: Non-Directional Beacon Replacement (NDB Rpl) [6349]

Provides for the sustainment of selected Non-Directional Beacons (NDB).

Mechanism: Precision Runway Monitor Multilateration Technology (PRM MLAT Technology) [7343]

The Precision Runway Monitor (PRM) system allows simultaneous independent approaches on closely spaced parallel runways less than 4,300 feet apart, returning a portion of lost capacity during adverse weather conditions and thereby reducing delays. The PRM system is an accurate electronic scan (E-scan) radar that tracks and processes aircraft targets in a one second update rate (as opposed to 4.8 seconds with conventional radars). The PRM system provides the controller with automatic alerts and high resolution displays that, in conjunction with specific procedures, enable pilots to fly simultaneous independent approaches to parallel runways spaced less than 4,300 feet.

The multilateration (MLAT) subsystem is a beacon based, cooperative surveillance sensor that provides target positions throughout the defined coverage volume. The MLAT subsystem provides accurate position and identification information on transponder-equipped aircraft and transponder-equipped surface vehicles by performing multilateration on signals transmitted by the transponder. The MLAT data would then be formatted and sent to facilities equipped with an existing integrated Standard Terminal Automation Replacement System (STARS) display to accomplish the precision runway monitoring functionality.

Mechanism: Simplified Directional Facility (SDF) [2327]

Simplified Directional Facility (SDF) is a navigational aid (NAVAID) used for nonprecision instrument approaches. The final approach course is similar to that of an Instrument Landing System (ILS) localizer for lateral guidance to the approach procedure decision threshold. However, the SDF course may be offset from the runway, generally not more than 3 degrees, and the course may be wider than the localizer, resulting in a lower degree of accuracy. A glide slope path is not provided. The SDF signal is fixed at either 6 degrees or 12 degrees as necessary to provide maximum flyability and optimum course quality. Identification consists of a three-letter identifier transmitted in Morse code on the SDF frequency. The appropriate instrument approach chart will indicate the identifier used at a particular airport. The SDF transmits signals within the range of 108.10 to 111.95 MHz. The approach techniques and procedures used in an SDF instrument approach are essentially the same as those employed in executing a standard localizer approach except the SDF course may not be aligned with the runway and the course may be wider, resulting in less precision.

Mechanism: Tactical Air Navigation System (TACAN) [2182]

Tactical Air Navigation (TACAN) is a UHF (ultra high frequency) ground-based radio navigation aid that is the military counterpart of VHF Omnidirectional Range co-located with Distance Measuring Equipment (VOR/DME). TACAN avionics provide both the bearing and slant range to the ground station. TACAN is often collocated with civil VOR systems to form a VORTAC to support both civil and military flight operations. TACAN is approved as a primary navigation system in the National Airspace System (NAS).

Mechanism: Tactical Air Navigation System Replacement (TACAN Rpl) [6345]

Tactical Air Navigation (TACAN) is a UHF (ultra high frequency) ground-based radio navigation aid that is the military counterpart of VHF Omnidirectional Range/Distance Measuring Equipment (VOR/DME). It is the primary tactical air navigation system for the military services ashore and afloat. TACAN avionics provide both the bearing and slant range to the ground station - and hence a navigational position fix. Many avionics models include an air-to-air mode that enables aircraft to determine distance from each other, which can be particularly useful in rendezvous operations. TACAN is often collocated with civil VOR stations (Denoted as VORTAC facilities) to permit military aircraft to operate in civil airspace. TACAN is approved as a primary navigation system in the National Airspace System (NAS).

Mechanism: Transponder Landing System (TLS) [1407]

The TLS is intended only for private use; no public procedures will be published. The system is designed to provide approach guidance using existing avionics: ILS localizer/glideslope and Mode 3 transponders. TLS operates with special procedures that require pilot training. Operation is limited to one aircraft at a time. Ground equipment consists of a transponder interrogator, sensor arrays to detect transponder replies, and ILS-frequency transmitters. The TLS determines the aircraft''s vertical and azimuth position by processing the transponder replies. The aircraft''s position is computed relative to the desired approach path and translated into appropriate localizer and glide slope signals which are broadcast to and displayed on the aircraft''s Course Deviation Indicator. The TLS broadcast guides the aircraft on the proper course and glide path to the approach decision height.

The TLS''s at Pullman/Moscow (PUW) and Rhinelander-Oneida (RHI) are leased systems. PUW’s TLS is expected to be removed from service in FY-05.

FY-05 Congressional funding was provided with direction that it be used to conduct site surveys at approximately 30 additional airports and, in consultation with the airports, to evaluate other landing system alternatives.

Mechanism: Very High Frequency Omnidirectional Range (VOR) [211]

The Very High Frequency Omnidirectional Range (VOR) is a ground-based radio navigation aid that broadcasts azimuth information to aircraft. VORs broadcast on assigned channels and include the facility identification in Morse code for pilot monitoring and verification. Some VORs are capable of broadcasting weather information and supporting pilot-controller communcations although these capabilities are typically provided by other systems. In addition to providing en route and terminal area azimuth guidance, VORs also support nonprecision instrument approach operations.

Currently, VORs are the primary radio navigation aid in the National Airspace System (NAS). They serve as the internationally designated standard short-distance radio navigation aid for air carrier and general aviation Instrument Flight Rules (IFR) operations.

VORs may be installed stand-alone or co-located with either a DME or TACAN system. When co-located the facility is typically referred to as a VOR/DME or VORTAC facility, respectively. This configuration allows pilots to determine their aircraft''s bearing and distance to a single location, i.e., a position fix.

With the advent of sattelite-based navigation capabilities, a planned reduction in operational VORs will begin in approximately 2010. The reduction will result in a minimum operational network (MON) of VORs that will support IFR operations at the busiest airports in the NAS while serving as a backup for satellite-based navigation.

Mechanism: Very High Frequency Omnidirectional Range Replacement (VOR Rpl) [6346]

The Very High Frequency Omnidirectional Range (VOR) system is a ground-based radio navigation aid that broadcasts navigation signals, 360 degrees in azimuth, oriented from magnetic north, plus a periodic Morse code identification signal. VOR avionics indicate the azimuth (bearing) to or from the VOR transmitter. Some VOR stations are used for the broadcast of weather information. Air Traffic Control (ATC) or Flight Service Station (FSS) specialists may use the voice features for transmitting instructions or information to pilots.

VOR is the primary radio navigation aid in the National Airspace System (NAS) and is the internationally designated standard short-distance radio navigation aid for air carrier and general aviation Instrument Flight Rules (IFR) operations. Because it forms the basis for defining the airways, its use is an integral part of the ATC procedures. In addition to providing en route and terminal area guidance, VORs also support nonprecision instrument approach operations.

VORs may be provided alone, but are more often collocated with either a DME or TACAN system to form a VOR/DME or VORTAC facility, allowing aircraft to determine both the bearing and distance to the ground station - and hence a navigational position fix.

The number of VOR systems shown herein includes all systems whether stand-alone or co-located with an NDB, DME or TACAN system.

A reduction in the VOR (only) population is expected to begin in 2010. The proposed reduction will transition from todays VOR services to a minimum operational network (MON) that will support IFR operations at the busiest airports and serve as an independent backup navigation source to GPS and GPS/WAAS. Those VORs that remain in service will need to be replaced or SLEPd, as portrayed in the quantities depicted in this mechanism.

Mechanism: Very High Frequency Omnidirectional Range Test (VOT) [198]

A ground facility, which emits a test signal to check VOR receiver accuracy. Some VOTs are available to the user while airborne, and others are limited to ground use only. The airborne use of VOT is strictly limited to those areas/altitudes specifically authorized in the A/FD or appropriate supplement.

Mechanism: WAAS Corrections Broadcast Service (WAAS Corrections Broadcast Service) [631]

Wide Area Augmentation System (WAAS) ground uplink stations (GUS) transmit Navstar Global Positioning System (GPS) range correction information and data integrity messages to Geostationary Earth Orbit (GEO) satellites, which re-transmit the data for use by WAAS-equipped users. Airborne or terrestrial users use the correction information to accurately determine their 3-dimensional position for very accurate navigation or location purposes.

Since commissioning the FAA Wide Area Augmentation System (WAAS) in 2003, WAAS has used two Inmarsat geostationary satellites (GEO) to broadcast the WAAS signal. The satellites are Inmarsat I-3 F3 (POR) and Inmarsat I-3 F4 (AOR-W). The leases for these satellites are expiring and new satellites are coming on line as explained below.

Lockheed Martin is the contractor working FAA's WAAS Geostationary Communications and Control Segment (GCCS) initiative. A vital building block of WAAS-based broadcast services for aviation use, the GCCS creates additional user signals to improve system reliability. The Telesat Anik F1R satellite and the PanAmSat Galaxy 15 satellite both with GCCS payloads were launched in September and October 2005, respectively. Lockheed Martin and the FAA will perform 12 months of segment and system level integration and test prior to the WAAS GCCS service going operational in October 2006.

Also the Inmarsat AOR-W was moved west in the period February-April 2006.

When these satellite activities are complete - the AOR-W move and the debut of the PanAmSat WAAS broadcast - the net result will be better service availability for the users. In the past, both Alaska and the eastern two-thirds of the U.S. have only been within the broadcast footprint of one WAAS GEO. As a result, both of these expansive areas were vulnerable to a loss of WAAS service if one of the two WAAS GEOs failed for any period of time. In its new location, the AOR-W satellite footprint will now cover all of Alaska. Additionally, the new PanAmSat broadcast will also cover all of Alaska. Alaska will gain double redundant coverage. The benefit is similar in the eastern two-thirds of the U.S. where the new PanAmSat broadcast will add a second layer of WAAS coverage. By the end of 2006, the majority of all WAAS users within the United States will now be in view of at least two WAAS GEOs, and in some cases in view of three WAAS GEOs.

Additional information at http://gps.faa.gov

Mechanism: WAAS Master Station (WMS) [7040]

The FAA Wide Area Augmentation System (WAAS) uses a network of precisely located ground reference stations, called Wide Area Reference Stations (WRS), which monitor Navstar Global Positioning System (GPS) satellite signals. These stations are located throughout the continental U.S., Hawaii, Puerto Rico, Alaska, Canada, Mexico, and several other international locations. The stations collect and process GPS information and send the information to two WAAS Master Stations (WMS).

The WMSs develop a WAAS correction message that is sent via Ground Uplink Stations (GUS) to user receivers via navigation transponders on geostationary satellites (GEO). The WAAS message improves the accuracy, availability, and safety of GPS-derived position information. Using WAAS, GPS signal accuracy is improved from 20 meters to approximately 1.5 – 2 meters in both the horizontal and vertical dimensions.

The two WMS facilities are in San Diego CA and Herndon VA.

Mechanism: Wide Area Augmentation System (WAAS) [561]

The Wide Area Augmentation System (WAAS) consists of a distributed array of Reference and Master Stations designed to provide range correction and integrity information messages that are used by WAAS-capable Global Positioning System (GPS) avionics to accurately determine an aircraft''s 3-dimensional (3-D) position in space. Accurately surveyed WAAS Reference Stations (WRS) receive and process GPS satellite range data which is forwarded to redundant WAAS Master Stations (WMS) for additional processing before sending the resulting range-correction data to redundant WAAS Ground Uplink Stations (GUS). The GUS transmit the data to Geostationary (GEO) satellites, which retransmit them on a GPS civil-use frequency for reception by GPS/WAAS avionics. The WAAS data enables aircraft to determine their position in the airspace with an accuracy that will enable, for WAAS-equipped aircraft, introduction of advanced navigation initiatives such as precision and non-precision approaches to airports throughout the National Airspace System (NAS), and reduced longitudinal separation.

The WAAS service volume includes the contiguous United States, Hawaii, portions of Alaska and the Caribbean, and the United States border areas with Canada and Mexico. Using just the single civil frequency that is currently available from GPS, WAAS supports a near-precision instrument approach capability termed Localizer Performance with Vertical Guidance (LPV). Planned enhancement of WAAS with additional WRS and GEO satellites will improve the coverage and availability of WAAS, leading to Full LPV Performance (FLP) in 2008.

As of April 2006 the FAA had 25 WRS installations operational in the NAS. The present installation schedule is as follows: Four WRSs, installed in Alaska, are scheduled to be added to the NAS in August 2006. Two WRSs, installed in Canada at Goose Bay and Gander, are scheduled to be added to the WAAS in August of 2007. Three WRSs, installed in Mexico at Mexico City, Merida, and Puerto Vallarta, are scheduled to be added to the WAAS in August of 2007. Two WRS, which will be installed in Canada at Winnipeg and Iqaluit, in the summer of 2006, are scheduled to be added to the WAAS in February 2008. Two WRS, which are scheduled to be installed in Mexico at Tapachula and San Jose

Del Cabo, in the summer of 2006, should be added to the WAAS in February 2008. Thus, the end quantity of WRS will be 38, in the spring of 2008.

Modernization of GPS by the U.S. Department of Defense (DoD) will provide a second civil frequency (termed L5) for WAAS in the 2015 timeframe. New dual-frequency WAAS avionics will then provide a precision instrument approach capability equivalent to Instrument Landing System (ILS) Category I operations. This capability is termed Global Navigation Satellite System (GNSS) Landing System (GLS).

Mechanism: Wide Area Augmentation System (WAAS) - GNSS Landing System (WAAS GLS) [6474]

WAAS operational capabilities occur in three segments: LNAV/VNAV and Initial LPV Performance; Full LPV Performance; and Global Navigation Satellite System (GNSS) Landing System (GLS), which will provide a precision approach capability equivalent to Category I Instrument Landing System (ILS) operations.

GLS service will be achieved through the use of dual civil frequencies on GPS and WAAS satellites. The U.S. Government plans to upgrade the GPS constellation to dual frequency (L1, L5), which is scheduled to be operational during the 2013 - 2015 timeframe.

Mechanism: Wide Area Augmentation System Technology Refresh (WAAS Tech Refresh) [1660]

Elements of WAAS technical refresh consist of two paths. One is improvement to operational capability that enhances performance of WAAS. The other is the known replacement of equipment, including hardware, software, and telecommunications links and networks within the WAAS, WMS and GUS.

The May 2004 re-baselining projects Tech Refresh to begin in FY-2014 & to continue through the WAAS life-cycle, which ends in 2028.

Mechanism: Wide Area Augmentation System Telecommunications Subsystem (WAAS TCS) [7068]

The Wide Area Augmentation System (WAAS) Telecommunications Subsystem (TCS) is being upgraded to provide the foundation for future WAAS enhancements. As a part of the upgrade, two new racks of WAAS equipment have been installed at each of the WAAS backbone sites. These sites are located in Air Route Traffic Control Centers (ARTCC) in Chicago, Atlanta, Los Angeles, and Washington, D.C. Additionally, two new racks of WAAS equipment were installed at the Seattle Air Route Traffic Control Center (ARTCC) to establish a gateway between the seven Alaskan Wide-Area Reference Station (WRS) satellite circuits and the existing continental U.S. (CONUS) terrestrial backbone circuits.

This new equipment increases WAAS network capability. This additional capability is needed to support the 13 new WAAS WRS being installed in Alaska, Canada, and Mexico; and the new WAAS Wide-area Master Station (WMS) being installed in Atlanta. The 13 new WRS will be added to the existing 25 operational WRSs during the 2006-2007 time frame. Additionally, the TCS upgrade will handle the four new ground uplink station (GUS) sites required to support two new Geostationary Communication and Control Segment (GCCS) geostationary satellites that will go on line in 2006–2007 to provide the WAAS network with greater availability, reliability and performance.

In addition to increasing network capability, this new TCS equipment: (1) Lowers equipment removal/replacement time; (2) Lessens procedures for fault isolation; (3) Removes the non-procurable power supply from WAAS parts inventory. (4) Provides technicians with a co-located patch panel for troubleshooting.

The WAAS TCS is a physically diverse and secure network used to transfer data between geographically dispersed components of the WAAS. Although most of the network is terrestrial, satellite services are used to reach locations with little or no terrestrial communication infrastructure.

Mechanism: Wide-Area Reference Station (WRS) [7026]

A Wide-Area Reference Station (WRS) is a ground-based facility that gathers the raw Navstar Global Positioning System (GPS) data that""s used to create corrections for the FAA Wide Area Augmentation System (WAAS). As of April 2006 there were 25 WRS locations around North America. They have precisely known locations that can be used to measure the moment-to-moment accuracy of the GPS data. Data from each WRS is sent to the Wide Area Master Station (WMS), where WAAS correction information is generated.

The following 25 WRS were all brought on line in July 2003: Albuquerque, NM; Anchorage, AK; Atlanta, GA; Billings, MT; Boston, MA; Chicago, IL; Cleveland, OH; Cold Bay, AK; Denver, CO; Fort Worth, TX; Honolulu, HI; Houston, TX; Jacksonville, FL; Juneau, AK; Kansas City, KS; Los Angeles, CA; Memphis, TN; Miami, FL; Minneapolis, MN; New York, NY; Oakland, CA; Salt Lake City, UT; San Juan, PR; Seattle, WA; and Leesburg, VA. The following four WRS came on line in August 2006 Barrow, AK; Bethel, AK; Fairbanks, AK; and Kotzebue, AK.

The following nine WRS are planned for the future: Goose Bay, Labrador; Gander, Newfoundland; Mexico City, Federal District; Merida, Yucatan; Puerto Vallarta, Jalisco; Winnipeg, Manitoba; Iqaluit, Nunavut; Tapachula, Chiapas, and San Jose Del Cabo, Baja California Sur.

Domain: Air Traffic Control Surveillance

Cooperative Surveillance

Mechanism: ASDE-X Technological Refresh and Disposition (ASDE-X Tech Refresh and Disposition) [7344]

The Airport Surface Detection Equipment - Model X (ASDE-X) is a modular surface surveillance system capable of processing radar, multilateration, and Automatic Dependent Surveillance-Broadcast (ADS-B) sensor data which provides seamless airport surface surveillance to air traffic controllers. The ASDE-X system was designed for second tier airports that are not covered by the ASDE-3 (AMASS) program.

The ASDE-X Technological Refresh and Disposition mechanism provides for the technological refresh and eventual disposition of the equipment.

Mechanism: Air Traffic Control Beacon Interrogator - Model 6 (ATCBI-6) [301]

The Air Traffic Control Beacon Interrogator Model 6 (ATCBI-6) is a ground-based system that interrogates transponders, receives, and processes replies from transponders, determines the range and azimuth to the aircraft, and forwards the information to appropriate air traffic control (ATC) automation systems. Replies provide identification and altitude data of the transponder. The ATCBI-6 Replacement Program will procure 129 Monopulse Secondary Surveillance Radar (MSSR) with Selective Interrogation (SI) to replace existing operational beacons, which includes four support systems (not shown in the quantities below) for training, testing, logistics, and operational support.

Through Fiscal Year (FY) 2005 135 systems had been ordered, 77 systems had been delivered to sites, and 51 systems commissioned. As of 17 November 2005 54 ATCBI-6 systems had been commissioned.

In FY 2006 up to 15 March 2006 five systems had completed Initial Operational Capability (IOC), and nine additional systems had been delivered.

Mechanism: Air Traffic Control Beacon Interrogator-Model 3 (ATCBI-3) [243]

The Air Traffic Control Beacon Interrogator-Model 3 (ATCBI-3) is an air traffic control beacon system that interrogates transponder-equipped aircraft. It provides, through a secondary radar system, interrogation of transponders and reception of aircraft identification and position data.

ATCBI-3s incorporated 1950s tube technology, and all were decommissioned by the late 1990s as a result of Mode Select (Mode S) deployments and ATCBI-4/5 relocations.

Mechanism: Air Traffic Control Beacon Interrogator-Model 4 (ATCBI-4) [237]

The Air Traffic Control Beacon Interrogator-Model 4 (ATCBI-4) is an air traffic control (ATC) beacon system that interrogates transponder-equipped aircraft. It is a secondary radar system that interrogates transponders, receives aircraft identification, and determines position data.

Mechanism: Air Traffic Control Beacon Interrogator-Model 5 (ATCBI-5) [238]

The Air Traffic Control Beacon Interrogator-Model 5 (ATCBI-5) is an air traffic control (ATC) beacon system that interrogates transponder-equipped aircraft. It is a secondary radar system that interrogates transponders, receives aircraft identification, and determines position data.

Mechanism: Airport Surveillance Radar-Model 9/Mode Select ASTERIX Upgrade (ASR-9/Mode S ASTERIX Upgrade) [6449]

The ASR-9/Mode S All-purpose Structured EUROCONTROL Radar Information Exchange (ASTERIX) Upgrade provides improved surveillance data interface capabilities to National Airspace System (NAS) automation systems. This will allow additional data currently available at the radar site to be sent to automation systems for improved tracking and data networking. This upgrade is currently planned to be implemented after the completion of the ASR-9/Mode S Service Life Extension Program (SLEP), and will extend through the lifespan of the original SLEP implementation.

This mechanism will be replaced at the end of its life cycle by the New Terminal Surveillance System (for terminal sites) and the New En Route Surveillance System (for en route sites).

Mechanism: Beacon Interrogator, Military (OX-60) [2447]

The OX-60 is a secondary (beacon) system collocated with the 12 joint-use FPS-117 long-range primary radars in Alaska and 1 joint-use FPS-117 in Hawaii. It is used to interrogate transponder-equipped aircraft, receive aircraft identification, determine aircraft position, and forward the information to appropriate U.S. Department of Defense (DoD) and FAA air traffic control (ATC) automation systems.

Mechanism: Beacon Interrogator, Military (UPX-39) [2446]

The UPX-39 is a new secondary surveillance radar (SSR) beacon system that will replace the 12 OX-60 secondary (beacon) radars in Alaska (12) and Hawaii (1) at the 13 joint-use (FPS-117 primary radar) facilities to improve the quality, reliability, and availability of radar data used for air traffic control (ATC) and to reduce FAA and United States Air Force (USAF) maintenance costs. The FAA will use existing interfaces to provide the radar data to the Air Route Traffic Control Center (ARTCC) facilities. The FAA provides technical support and funds its share of the cost associated with the fabrication, installation, and acceptance of 13 systems at the joint-use radar facilities.

Mechanism: Beacon Interrogator, Military (TPX-42) [6457]

The TPX-42 beacon interrogator is a military analog interrogator (Identify Friend or Foe (IFF)) system used to detect and report the identity and location of aircraft in a specific volume of airspace. It is used in conjunction with the GPN-20 military airport surveillance radar (ASR). The TPX-42 is similar to the FAA's Air Traffic Control Radar Beacon Interrogator Models 4 and 5 (ATCBI-4/5).

Mechanism: Digital Airport Surveillance Radar (DASR) [2004]

The Digital Airport Surveillance Radar (DASR) provides advanced digital primary radar including weather intensity surveillance with an integrated monopulse Secondary Surveillance Radar (SSR) system for use in the airport terminal area. (A military version of the Airport Surveillance Radar Model 11 (ASR-11)).

Mechanism: Mode Select (Mode S) [239]

The Mode Select (Mode S) mechanism is a ground-based system capable of selective interrogation of Mode S transponders and general interrogation of Air Traffic Control Radar Beacon System (ATCRBS) transponders within range. The system also receives, processes, and forwards the transponder replies to appropriate air traffic control (ATC) automation systems. Data formats for both interrogation and reply include data exchange capability.

The system also provides a Traffic Information Service (TIS) function that makes local traffic data available to the flight deck via the Mode S data link. TIS, a Mode S data link service, provides automatic traffic advisories to properly equipped aircraft. Pilots are able to request and receive a display of nearby traffic. The relative range, bearing, and altitude (if known) and a "proximate" or "threat" classification of nearby aircraft will be displayed in the cockpit.

Mechanism: New En Route Surveillance System (New En Route Surveillance System) [640]

The New En Route Surveillance System is a future generation surveillance system capable of providing cooperative surveillance capabilities in the en route environment commensurate with the technology at that time. This system will replace the new Air Traffic Control Radar Beacon Interrogator Model 6 (ATCBI-6) and en route Mode Select (Mode S) systems at the end of their life cycles.

Mechanism: New Terminal Surveillance System (New Terminal Surveillance System) [245]

The New Terminal Surveillance System replaces existing terminal radar systems with new radars that incorporates primary and secondary surveillance and Doppler weather radar capability.

Since Automatic Dependent Surveillance-Broadcast (ADS-B) may be used in lieu of secondary surveillance at some locations, the New Terminal Radar will include just the primary surveillance and Doppler weather radar capabilities at those locations. The determination of these locations will depend on the outcome of future ADS-B investment decisions.

Mechanism: Precision Runway Monitor (PRM) [244]

The Precision Runway Monitor (PRM) system is a highly accurate electronic scan (E-Scan) radar that tracks and processes aircraft targets once per second (as opposed to 4.8 seconds with conventional radars). PRM provides the controller with automatic alerts and high resolution displays that enable independent, simultaneous approaches to parallel runways spaced less than 4,300 feet. Airports with parallel runways can use those runways independently during Visual Meteorological Conditions (VMC); however, during Instrument Meteorological Conditions (IMC), closely spaced runways cannot be used for independent or simultaneous approaches without PRM. Installing PRM radars and displays can return a portion of the lost capacity and also reduce delays.

Seven PRM systems have been procured to date. PRM systems were commissioned in (1) Minneapolis-St. Paul International Airport (KMSP) in October 1997, (2) Lambert-Saint Louis International Airport (KSTL) in October 1998, (3) Philadelphia International Airport (KPHL) in September 2001, and (4) San Francisco International Airport (KSFO) in October 2004. A fifth PRM system was installed at New York's John F. Kennedy International Airport (KJFK) but was subsequently dismantled and removed. A sixth PRM system was commissioned at Cleveland Hopkins International Airport (KCLE) in May 2005. A PRM system has been delivered to Atlanta Hartsfield-Jackson International Airport (KATL) in February 2006 and is scheduled to be commissioned in April 2007. Finally, a multilateration-based PRM-A system (NAS CIP Project S08.01-01) is scheduled to be commissioned at the Detroit International Airport (KDTW) in June 2008.

Mechanism: Precision Runway Monitor Service Life Extension Program (PRM SLEP) [6409]

The Precision Runway Monitor Service Life Extension Program (PRM SLEP) extends the service life of the PRM sensor (secondary radar system) through at least 2025. The PRM is similar to the Mode Select (Mode S), which operates and updates targets at a faster rate than that of the normal Air Traffic Control Radar Beacon System (ATCRBS) or Mode S system. This faster update rate provides improved precision in predicting target positions. The PRM system is utilized to increase efficiency of operations during instrument meteorological conditions (IMC) by allowing independent simultaneous approaches to parallel runways spaced less than 4,300-feet apart. The Standard Terminal Automation Replacement System (STARS) provides the display function for the air traffic controllers.

A decision for the continuation of PRM, or removal from service, based on required navigation performance (RNP) and multilateration is scheduled for 2009.

Mechanism: Surveillance Data Network (SDN) [6315]

National Airspace System (NAS) surveillance systems, including radar and automatic dependent surveillance (ADS) systems will provide surveillance data objects via the Surveillance Data Network (SDN), which is a sub-network of the proposed System Wide Information Management (SWIM) and the FAA Telecommunication Infrastructure (FTI). The published Surveillance Data Objects (SDO) will be made available to users of the National Airspace System (NAS), including the Transportation Security Administration (TSA), U.S. Department of Defense (DoD), and others. Surveillance data availability supports 3-mile separation standards, gate-to-gate traffic management, seamless airspace, and dynamic resectorization. Improved surveillance information is provided in a timely and consistent manner seamlessly across the NAS for operations, planning, and decision-making. The information will be available to all users and service providers via SDO in near real time. This information enables decisions to be based on a shared common view of situations, even as conditions are changing. Improved surveillance with SDOs will provide the automation higher quality of data for seamless surveillance and, in combination with other capabilities and new procedures, enable capacity and safety improvements. These benefits accrue from increased situation awareness by decision makers and improved operation of decision support and analysis tools that use surveillance information.

Dependent Surveillance

Mechanism: Automatic Dependent Surveillance (Capstone) Ground Station (ADS (Cap) Ground Station) [1408]

The Automatic Dependent Surveillance (Capstone) Ground Station (ADS (Cap) Ground Station) is a demonstration system used by the Capstone project under Safe Flight 21. It receives Global Positioning System (GPS)-derived aircraft four (4)-dimensional position data, aircraft identification, aircraft velocity, and other selected aircraft data for processing at air traffic control (ATC) facilities, and transmits Traffic Information System-Broadcast (TIS-B) information on aircraft in areas of radar coverage (and other airspace status information when available) to properly to equipped aircraft, to support operational trials. These ground stations are located in remote locations in Alaska, and feed the automation system at the Anchorage (KZAN) Air Route Traffic Control Center (ARTCC).

Mechanism: Automatic Dependent Surveillance-Broadcast NAS-Wide Deployment (ADS-B NAS-Wide Deployment) [6517]

The Automatic Dependent Surveillance-Broadcast (ADS-B) National Airspace System (NAS)-Wide Implementation program offers the FAA an emerging technology directed at enhancing safety, capacity, productivity, and efficiency, while lowering FAA, operator, and user costs. ADS-B technology is the initial step in creating a more flexible air transportation system, as envisioned in the Joint Planning and Development Office's (JPDO) Next Generation Aviation Transportation System (NGATS) Plan to create a seamless surveillance and shared situational awareness picture for both ground and air operations throughout the NAS. To meet both the current and future needs, the NAS needs to provide this seamless surveillance and shared situational awareness picture on the surface before takeoff, throughout the flight, and until final shutdown.

The FAA plans to use two types of data links in its ADS-B implementation -- one for general aviation (GA) aircraft and another for airline aircraft. GA aircraft will be equipped with Universal Access Transceiver equipment, and airline aircraft will use Mode S transponders on 1090 MHz as they do in Europe.

Segment 1 of the program consists of ADS-B infrastructure deployment, the issuance of a notice of proposed rulemaking (NPRM), expansion of the Traffic Information Service–Broadcast (TIS-B) and Flight Information Service–Broadcast (FIS-B) infrastructure and basic aircraft to aircraft application deployment. The three proposed locations for Segment 1 implementation are Juneau, Alaska, the Gulf of Mexico (GOMEX), and Louisville, Kentucky.

The FAA Joint Research Council (JRC) approved funding on 07 June 2006 for ADS-B for the GOMEX region. ADS-B is expected to improve weather, direct communications and surveillance capabilities for the more than 650 helicopters supporting the offshore oil industry in the Gulf. Oil platform and helicopter operators will provide space for installation of ADS-B equipment.

Segment 2 includes complete ADS-B NAS-wide infrastructure deployment, publication of the final rule, the start of avionic equipage, the completion of TIS-B and FIS-B deployment, the continuance of basic aircraft to aircraft application deployment and requirements definition for advanced aircraft to aircraft application development.

It is estimated that by 2010, the ADS-B system will be operational in 10 to 15 percent of U.S. airspace. As of May 2006 there were 40 sites in the United States with Ground-Based Transceivers (GBT) that provide ADS-B coverage that can be used by suitably equipped aircraft. The FAA plans to install 400 GBT by 2014.

Segment 3 provides complete avionics equipage, targeted removal of legacy surveillance, complete basic aircraft to aircraft application deployment and the initiation of advanced aircraft to aircraft application deployment.

Segment 4 includes complete removal of targeted legacy surveillance, TIS-B removal and completion of the advanced aircraft to aircraft application deployment.

Status Information at http://www.adsb.gov

Mechanism: Broadcast Services Ground Station (BSGS) [6313]

The Broadcast Services Ground Station (BSGS) supports Air-Ground broadcast services. This includes the reception of Automatic Dependent Surveillance-Broadcast (ADS-B) from equipped aircraft/vehicles and the transmission of Traffic Information Service-Broadcast (TIS-B) and Flight Information Service-Broadcast (FIS-B) reports from the TIS-FIS Broadcast Servers for use by equipped aircraft. Generally, the BSGS will interface via the Surveillance Data Network (SDN) to provide ADS-B information to air traffic control (ATC) automation and receive TIS-B and FIS-B reports from TIS-FIS Broadcast Servers. The BSGS includes antenna(s), one or more dual link (i.e., 1090 MHz Extended Squitter-1090ES (Extended Squitter) and Universal Access Transceiver (UAT) Ground Based Transceiver(s)(GBT), processing functions and communications functions. Several configurations of the BSGS are required to support variations in the geographic service volume and functions to be supported at specific categories of operational sites. BSGSs will be installed at 448 airports and 100 en route locations. Included are those airports equipped with Secondary Surveillance Radar (SSR) and about 140 additional towered airports (currently without SSR). The BSGS will support ADS-B and TIS-B services via both the 1090ES link and by the UAT link. The BSGS will also support FIS-B via the UAT link. BSGSs incorporate a multi-link gateway function that provides ADS-B rebroadcasts via the ADS-B alternate link. A BSGS incorporating two GBTs are required for airport surface and terminal surveillance coverage at each of 268 smaller airports, a BSGS incorporating three GBTs (on average) are required at 120 of the mid-sized airports, and a BSGS incorporating six GBTs (on average) are required at the 60 largest airport (those equipped with Airport Surveillance Detection Equipment-Model X (ASDE-X) or ASDE-3 surface surveillance systems).

The following BSGS functions are required to support the various categories of National Airspace System (NAS) BSGS sites, except as noted below: (1) 1090ES and UAT receive/transmit (i.e., the GBT function); (2) multi-link gateway function; (3) process received ADS-B messages and output (via the SDN) ADS-B reports for use by ATC automation; (4) accept TIS-B and FIS-B reports from ground TIS-FIS Broadcast Servers and manage the generation and broadcast of link specific TIS-B messages via the 1090ES and UAT links and FIS-B messages via the UAT link.

The following BSGS configurations are assumed based on the category of the operational site. Except as noted below all BSGS configuration support the above-described functions.

En route (100 sites): (1) One multi-sector antenna with each sector connected to the individual 1090ES and UAT receivers. Supports up to 250 nautical miles (nmi). ADS-B reception. En route locations that are intended to provide only low-altitude gap filler coverage do not require the long-range capability. (2) One omni-directional transmit antenna. Transmitter power sized to support the required TIS-B and FIS-B coverage for that specific site.

Terminal/Airport without ASDE-X (415 airports incl. 27 ASDE-3 equipped airports) with each site having: (1) BSGS with at least two GBTs with omni-directional antennas sited for both airport surface and terminal airspace coverage; (2) additional GBTs as needed to provide coverage of the primary airport surface movement area.

Terminal/Airport with ASDE-X (26 ASDE-X plus 7 upgraded ASDE-3 airports with an average of 6 GBTs per BSGS): (1) ASDE-X ground stations upgraded to support GBT functionality; (2) At least two of the GBTs provide ADS-B coverage to the edge of the terminal airspace and the TIS-B coverage; and (3) ASDE provides the surveillance data source to support TIS-B for surface traffic.

Mechanism: Safe Flight 21 - Alaska Capstone Initiative (SF-21 - Alaska Capstone Initiative) [7183]

The Safe Flight 21 - Alaska Capstone Initiative provides an improved ground and air infrastructure that furnishes pilots better information about the location and severity of hazardous weather, proximity to terrain, improved instrument approaches to small airports, and traffic situations to reduce accidents. Additionally, the Alaska Capstone program provides improved surveillance information to controllers to assist them in sequencing, separation, flight following, and search and rescue activities. A more useable Instrument Flight Rules (IFR) infrastructure will be provided to enable lower en route and approach/departure routes. The Alaska Capstone program is demonstrating the use of Automatic Dependent Surveillance-Broadcast (ADS-B) communication links for two-way communication to and from an aircraft. ADS-B provides a link to transmit the aircraft position determined from onboard navigation systems to an air traffic control (ATC) facility, and information on weather and other aircraft in the area is transmitted from a ground-based transceiver to the pilot.

Mechanism: Surface Traffic Information Processor (STIP) [6314]

The Surface Traffic Information Processor (STIP) would be an extension of the Automatic Dependent Surveillance-Broadcast (ADS-B)/Traffic Information Service-Broadcast (TIS-B) capability at 60 large airports equipped with Airport Surface Detection Equipment (ASDE) Model X or Model 3 systems. A processor would be added at each of these airports to support TIS-B for surface and nearby low-altitude traffic. The STIP will receive surveillance information from the ASDE-X or ASDE-3 system and generate TIS-B messages for delivery by the Broadcast Services Ground Stations (BSGSs) providing surface coverage at that airport. The STIP will support of subset of the functionality of the TIS-FIS Broadcast Server (that is intended to support TIS-B for airborne users), but the STIP will support a more real-time TIS-B with a higher update rates and lower latency consistent with the available surface surveillance data source and the needs to support surface movement operations.

Mechanism: Traffic Information Service-Flight Information Service Broadcast Server (TIS-FIS Broadcast Servers) [6319]

Traffic Information Service-Flight Information Service (TIS-FIS) Broadcast Servers will be located at 21 Air Route Traffic Control Centers and 8 consolidated Terminal Radar Approach Controls/Integrated Control Complex (ICC). TIS-Broadcast (TIS-B) will be needed if full Automatic Dependent Surveillance-Broadcast equipage is not achieved. Servers will receive surveillance data (i.e., based on Secondary Surveillance Radar, etc.) in the form of Surveillance Data Objects for each target aircraft and will create TIS-B reports. Servers will also receive FIS data from weather processors and create FIS-B reports. TIS-B and FIS-B reports are then routed to the BSGS for broadcasting in support of TIS-B and FIS-B functionalities. The TIS-B and FIS-B reports will be geographically filtered for the defined service volume of each Broadcast Services Ground Station (BSGS), and TIS-B reports will also be filtered for only non-ADS-B-equipped targets.

Independent Surveillance

Mechanism: ARSR-4 Automated Technical Documentation (ARSR-4 Automated Tech Docs) [7332]

The Air Route Surveillance Radar Model 4 (ARSR-4) Automated Technical Documentation (ARSR-4 Automated Tech Docs) program provides funding for automated technical documentation for the ARSR-4 system.

Mechanism: ASR-9 Palm Springs Transportable (ASR-9 Palm Springs Transportable) [7350]

The Airport Surveillance Radar Model 9 (ASR-9) Palm Springs Transportable (ASR-9 Palm Springs Transportable) segment provided funds to acquire a transportable Airport Surveillance Radar Model 9 for the Palm Springs Regional Airport (PSP) in California.

Mechanism: Air Route Surveillance Radar - Model 1E (ARSR-1E) [240]

The Air Route Surveillance Radar-Model 1E (ARSR-1E) is a 1970s analog radar. It is a long-range radar system with a maximum detection range of 200 nautical miles (nmi). The ARSR-1E is a surveillance system used to detect azimuth and slant range of en route aircraft operating between terminal areas. It also provides weather intensity data.

Mechanism: Air Route Surveillance Radar - Model 2 (ARSR-2) [241]

The Air Route Surveillance Radar-Model 2 (ARSR-2) is a 1970s analog radar. It is a long-range radar system with a maximum detection range of 200 nautical miles (nmi). The ARSR-2 is a surveillance system used to detect azimuth and slant range of en route aircraft operating between terminal areas. It also provides weather intensity data.

Mechanism: Air Route Surveillance Radar - Model 3 (ARSR-3) [229]

The Air Route Surveillance Radar-Model 3 (ARSR-3) is a 1980s radar that provides primary long-range surveillance data, including slant range and azimuth data. It processes the returns which includes demodulation, analog-to-digital conversion, moving target indicator (MTI) function, sensitivity time control, range and azimuth gating, and digital target extraction - all of which are performed digitally (with the exception of the demodulation and analog-to-digital conversion). In addition, the ARSR-3 has a weather channel with associated processing to provide weather contour information in digital format.

Mechanism: Air Route Surveillance Radar-Model 4 (ARSR-4) [230]

The Air Route Surveillance Radar-Model 4 (ARSR-4) is a three-dimensional, long-range, rotating phased array, primary surveillance radar with integrated height finder capability. It is part of the joint surveillance system (JSS) used in conjunction with ARSR-3 coverage as part of the nationwide air defense command surveillance network. In addition to functions peculiar to the military, the ARSR-4 performs the same basic functions of the ARSR-3, by providing primary long-range surveillance data, including slant range and azimuth data.

Mechanism: Airport Surface Detection Equipment Model 3/Airport Movement Area Safety System Upgrade (ASDE-3/AMASS Upgrade) [6368]

The Airport Surface Detection Equipment Model 3/Airport Movement Area Safety System (ASDE-3/AMASS) Upgrade provides for the technical refresh of the ASDE-3 and AMASS. Selected system components will be replaced or upgraded to extend the service life of these systems through 2023 (ASDE-X End of Service Life (EOSL)), at which point all ASDE systems (ASDE-3/AMASS, ASDE-3X, ASDE-X) will be replaced with a common system.

Mechanism: Airport Surface Detection Equipment Model X (ASDE-X) [820]

The Airport Surface Detection Equipment - Model X (ASDE-X) is a modular surface surveillance system that processes multiple radar sources, multilateration, and Automatic Dependent Surveillance-Broadcast (ADS-B) sensor data to provide seamless airport movement area coverage and aircraft identification to air traffic controllers. ASDE-X is being deployed to airports with no surface surveillance systems and airports with Airport Surface Detection Equipment – Model 3/Airport Movement Area Safety System (ASDE-3/AMASS) systems. There are New Establishments (airports with no current surface surveillance capability), Replacements (airports where existing ASDE-3/AMASS systems will be replaced with ASDE-X), and ASDE-X Upgrade sites (airports where the ASDE-3/AMASS systems will be upgraded with ASDE-X capability). The main difference between the ASDE-X and ASDE-X Upgrade configurations is the surface surveillance transmitter/radar antenna. ASDE-X uses the new Surface Movement Radar while the ASDE-X Upgrade uses the existing operational ASDE-3 radar. ASDE-X is planned for deployment to 35 operational sites (10 new establishment, 4 replacement, and 21 ASDE-X Upgrade) and three support systems.

The ASDE-X system provides air traffic controllers with a visual representation of the traffic situation on the airport surface movement area and arrival corridors in the form of aircraft and vehicle position information and flight identifications or call signs. This increased awareness of the situation on the airport surface movement area is essential in reducing runway collision risks and critical Category A & B runway incursions. The ASDE-X Safety Logic is an enhancement to the situational awareness provided by the ASDE-X system to air traffic controllers. ASDE-X Safety Logic uses surveillance information from ASDE-X to determine if the current and/or projected positions and movement characteristics of tracked aircraft/vehicles present a potential collision situation. Visual and audible alerts are provided to the controllers, which include critical information about the targets involved, such as identification and surface occupied.

In addition to improving safety through runway incursion prevention, the quality of the ASDE-X data resulting from the fusion of multiple surveillance sources enables decision support for (a) Positive correlation of flight plan information with aircraft position on controller displays, (b) Seamless surveillance coverage of the airport from arrival through departure, (c) Elimination of blind spots and coverage gaps; and (d) highly accurate, high update surveillance enabling situational awareness (even in inclement conditions) and conflict detection and resolution.

Four airports, General Mitchell International Airport (KMKE), Orlando International Airport (KMCO), T.F. Green Airport (KPVD), and Lambert-St. Louis International Airport (KSTL) are operational with the ASDE-X system.

Status as of 15 March 2006: The ASDE-X program was rebaselined on September 9, 2005. Through Fiscal Year (FY) 2005: 38 systems had been ordered, 13 systems delivered which included three support systems. One upgraded ASDE-X unit reached Initial Operational Capability (IOC) status, and four units obtained Operational Readiness Dates (ORDs).

ASDE-X Operating Plan Status for FY 2006: One unit reached IOC status, there was an ASDE-X Safety Logic In-Service decision, two ASDE-X units (one with ASDE-X Safety Logic) achieved ORD, and two units were delivered.

Mechanism: Airport Surface Detection Equipment-Model 3 (ASDE-3) [232]

Airport Surface Detection Equipment - Model 3 (ASDE-3) provides primary radar surveillance of aircraft and airport service vehicles on the surface movement area. ASDE-3 is installed at the busiest U.S. airports. Radar monitoring of airport surface operations (ground movements of aircraft and other supporting vehicles) provides an effective means of directing and moving surface traffic. This is especially important during periods of low visibility such as rain, fog, and night operations.

The ASDE-3 will undergo a Service Life Extension Program (SLEP) to extend its service life through 2015 (see ASDE-3 SLEP), which will enable it to more effectively support the Airport Movement Area Safety System (AMASS) through this same time period.

Mechanism: Airport Surface Detection Equipment-Model 3 Service Life Extension Program (ASDE-3 SLEP) [1684]

The Airport Surface Detection Equipment-Model 3 Service Life Extension Program (ASDE-3 SLEP) provides for the technical refresh of the ASDE-3 system. The following components will be replaced or upgraded: antenna azimuth encoders, transmitter power supply modulators, digital processing circuit cards, display units, and other obsolete parts. The SLEP will extend the life of the ASDE-3 through 2015, which will allow it to support the Airport Movement Area Safety System (AMASS) more effectively.

Future technology refreshes of the ASDE-3 will be included as part of the ASDE-3/AMASS Upgrade activity.

Mechanism: Airport Surface Detection Equipment-Model 3X (ASDE-3X) [2468]

Airport Surface Detection Equipment-Model 3X mechanism will add the functionality of ASDE-X to seven initially identified ASDE-3 sites. These seven ASDE-3 sites will have common functionality represented by the air traffic control (ATC) graphical user interface (GUI), the keyboard, the trackball, and the displays. The ASDE-3X will be a modular surface surveillance system capable of processing radar, multilateration, fusion, and Automatic Dependent Surveillance-Broadcast (ADS-B) sensor data for seamless airport surface surveillance to air traffic controllers.

The remaining 25 ASDE-3 sites will also be upgraded in the same fashion, based on the outcome of a future investment decisions.

Mechanism: Airport Surveillance Radar - Model 9 (ASR-9) [236]

The Airport Surveillance Radar - Model 9 (ASR-9) is a short range (60 nm) radar system for the airport terminal area. The ASR-9 processes the returns from aircraft targets, which includes demodulation, analog-to-digital conversion, range and azimuth gating, sensitivity timing control, and a moving target detection function. The moving target detector includes two-level weather contour processing, digital signal processing, correlation and interpolation processing, and surveillance processing. The ASR-9 has a separate weather channel with associated processing capable of providing six-level weather contours. The two-level weather contour processing associated with the moving target detector is only be used for backup. The six-level weather channel is primarily used to supplement Next Generation Weather Radar (NEXRAD) coverage. It is normally used in conjunction with Mode Select (Mode S) but it can accommodate an Air Traffic Control Beacon Interrogator Model 4/5 (ATCBI-4/5).

The ASR-9 will be upgraded/replaced with the ASR-9/Mode S SLEP (see separate mechanism) in the 2007-12 time frame.

Mechanism: Airport Surveillance Radar Model 11 (ASR-11) [233]

The Airport Surveillance Radar Model 11 (ASR-11) is a digital, combined primary and secondary surveillance radar (SSR), short-range radar system with a 60 nautical mile (nmi) detection range for medium and small activity airports. The ASR-11 provides advanced digital primary radar including weather intensity surveillance with an integrated monopulse SSR system for use in the airport terminal area. The ASR-11 is used to detect and report the presence and location of an aircraft in a specific volume of airspace. The ASR-11 provides search radar surveillance coverage in controlled airspace primarily in terminal areas.

As of June 2006, 22 ASR-11 systems have been commissioned. There have been 65 ASR-11 systems purchased with two additional systems to be purchased in fiscal year (FY) 2007. There are 25 operational ASR-11 systems, plus two support systems, and it is planned to have ten additional systems become operational in fiscal year (FY) 2006. Nine of the planned operational systems in FY 2006 have been completed.

Mechanism: Airport Surveillance Radar Model 8 (ASR-8) [235]

The Airport Surveillance Radar Model 8 (ASR-8) is a short-range (60 nautical mile (nmi)), analog radar system used to detect and report the presence and location of aircraft in a specific volume of airspace. It is used in conjunction with the Air Traffic Control Beacon Interrogator Models 4 or 5 (ATCBI-4 or ATCBI-5) or Mode Select (Mode S).

Mechanism: Airport Surveillance Radar, Military (GPN-20) [2028]

The GPN-20 radar is a military short-range (60 nautical miles (nmi)) analog radar system used to detect and report the presence and location of aircraft in a specific volume of airspace. It is used in conjunction with the TPX-42 military beacon (identify friend or foe (IFF)). The GPN-20 is the military version of the FAA's Airport Surveillance Radar Models 7 and 8 (ASR-7/8).

Mechanism: Airport Surveillance Radar-Model 7 (ASR-7) [234]

The Airport Surveillance Radar-Model 7 (ASR-7) is a short-range (60 nautical miles (nmi)) analog radar system used to detect and report the presence and location of aircraft in a specific volume of airspace. It is used in conjunction with the Air Traffic Control Beacon Interrogator-Model 4 or Model 5 (ATCBI-4 or ATCBI-5) or Mode Select (Mode S).

This system will be replaced by the ASR-11.

Mechanism: Airport Surveillance Radar-Model 9 and Mode Select SLEP (ASR-9/Mode S SLEP) [1683]

The second phase of the Airport Surveillance Radar Model 9 and Mode Select Service Life Extension Program (ASR-9/Mode S SLEP) was intended to address those activities necessary to provide long-term solutions to extend the service life of both the ASR-9 and Mode S systems. However, a review of the performance, reliability, maintainability, and operation of these systems, coupled with the FAA's investigation of alternative technologies as well as decreasing budgets, has recently (i.e. 2005) resulted in a decision to discontinue planning for Phase 2.

ASR-9/Mode S External Modifications (Phase 1A Baseline – September 2, 2004)

Through FY 2005: The Alternatives Analysis was completed and Phase 1A was baselined. Also 148 Remote Maintenance Terminal (RMT) were ordered and delivered, three Remote Maintenance Systems (RMS) were delivered, there were two installations, and two External Modification Kits

FY 2006 Operating Plan Status: Completed 16 installations, testing, and acceptance of ASR-9 External Modification Kits

ASR-9 Transmitter Modifications (Phase 1B Baseline-June 30, 2005)

Through FY 2005: The development contract was awarded. FY 2006 Operating Plan Status: Completed the Critical Design Review (CDR) planned for May 2006 for Transmitter Modification on December 13, 2005.

Mechanism: Evaluation of ASR-9 Siting (Evaluation of ASR-9 Siting) [7351]

The Evaluation of ASR-9 Siting segment is a placeholder for a Congressionally directed evaluation of the siting of the new Airport Surveillance Radar Model 9 (ASR-9).

Mechanism: Fixed Position Surveillance Model 20 Series (FPS-20 Series) [242]

The Fixed Position Surveillance Model 20 Series (FPS-20 Series) is a military primary radar of various models (FPS-20A, FPS-64, FPS-66A, FPS-67/A/B, and ARSR-60M) used by the FAA to detect slant range and azimuth of en route aircraft operating between terminals in the continental United States. Each of the different radar models is a similar variation of the original FPS-20 military radar.

Mechanism: Fixed Position Surveillance-Model 117 (FPS-117) [557]

The Fixed Position Surveillance-Model 117 (FPS-117) radar is a joint-use military surveillance system used by the FAA to detect slant range and azimuth of en route aircraft. These radars are located in Alaska (12) and Hawaii (1), and are expected to be sustained until at least 2020.

Mechanism: Height Monitor Unit (HMU) [2377]

The Height Measuring Unit (HMU) is a ground-based system that measures aircraft height within its area of cover for Reduced Vertical Separation Minima (RVSM) operation.

For 2005, the FAA continues developing the third and final set of simulations including interface with Mexico and Canada. Develop required modifications to National Airspace System (NAS) en route systems. Finalize Procedures, complete simulations, and begin implementation. Refine program, and complete national implementation. Continue program maintenance and modeling of enhancements.

Mechanism: LRR Restructuring - DoD Assets (LRR Restructuring - DoD Assets) [6825]

The long-range radar assets including the Air Route Surveillance Radar Models 1E, 2, 3, and 4 (ARSR-1E, ARSR-2, ARSR-3, ARSR-4), and Fixed Position Surveillance (FPS) radars have been transferred the U.S. Department of Defense (DoD). The FAA will continue to maintain these radars, but DoD will provide the funding.

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